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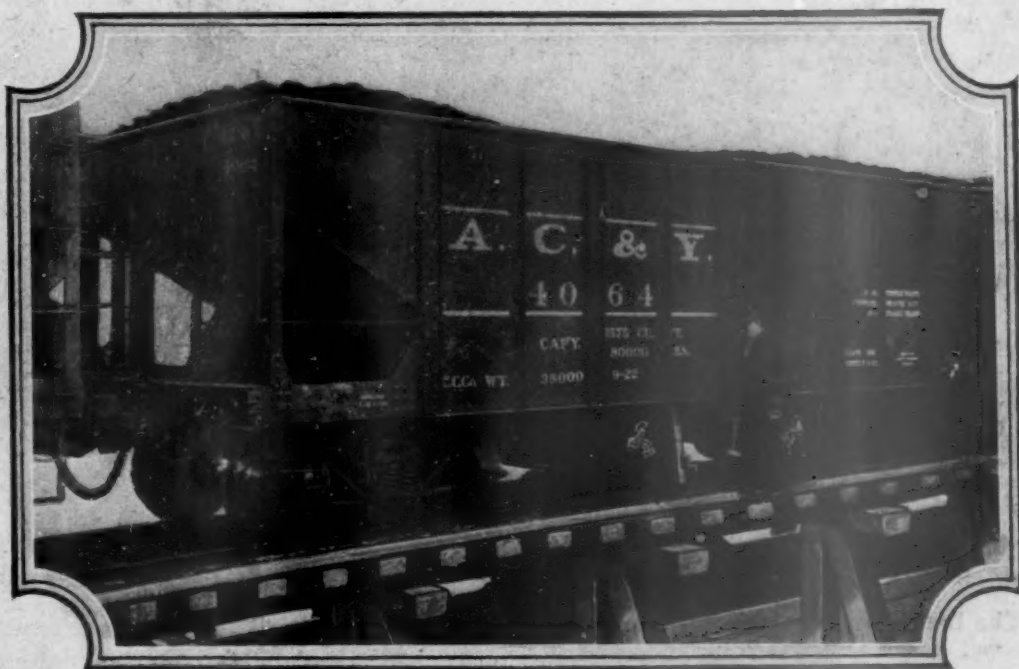
# Railway Age

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SIXTY-EIGHTH YEAR

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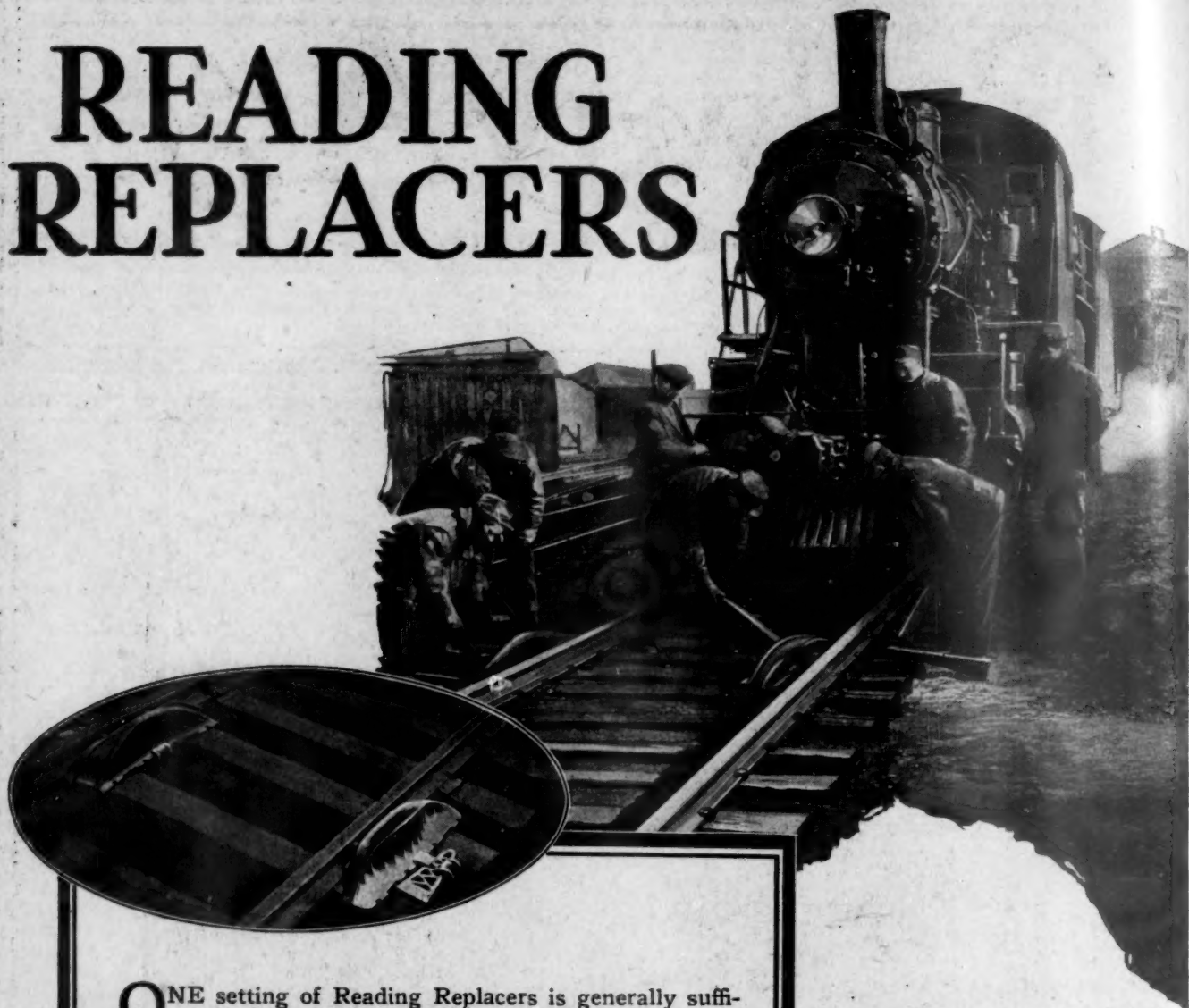
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# EDITORIAL



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## Meeting the Transportation Crisis

MEETINGS of both the American Railway Association and the Association of Railway Executives were held in New York last week at which plans were made to deal with the transportation crisis which is looming up ahead. The action taken was wise, timely and necessary. It is to be hoped the public can and will be made to understand the problem with which the railroads are confronted, and that its co-operation in solving it will be secured.

In a statement which was issued after these meetings some estimates based upon the experience of recent years were made regarding the amount of freight the railways will be called upon to handle in the year 1923. Because these estimates were based upon the experience of recent years, the *Railway Age* believes they understate the amount of business that will actually be available in 1923, and therefore minimize rather than magnify the difficulties that must be overcome if the business is to be handled.

It is estimated, for example, that the peak load of the year's traffic, which probably will come in October, will demand the loading of 1,085,000 freight cars in a week, about 7 per cent more than the maximum loading attained in 1920. This estimate apparently is based upon the fact that in the first 11 weeks of 1923 the number of cars loaded exceeded by 7 per cent the number loaded in the corresponding weeks of 1920. But the year 1920 was, and 1923 thus far has been a year of continuous and large "car shortages." Statistics for periods when there are car shortages measure the traffic *actually handled*, but do not accurately measure the *total demands of traffic*. The existence of a "car shortage" is itself proof that there is more business available than is actually being handled.

We believe the existing shortage of railroad transportation is very much greater than even most close students of the subject realize. The country is now in the midst of a period of business activity. There is no reason for believing that during the last 10 years its potential capacity for production and demand for transportation have increased any less than in earlier decades. Now, between 1910 and 1920 the number of tons actually moved one mile increased over 60 per cent. Taking two other periods 10 years apart, between 1906 and 1916 the number of tons moved one mile increased 60 per cent. Between 1903 and 1913 the number of tons moved one mile increased 75 per cent. These statistics show it is reasonable to estimate that if, in the year 1923, the railroads could fully meet all demands, the freight service rendered by them would exceed that of 1913 by at least 60 per cent. The number of tons carried one mile in 1913 was 301 billion, and a 60 per cent increase in this would make the number of tons carried one mile in

1923 over 480 billion. If this amount of freight service should be rendered in 1923 it would exceed the freight service rendered in 1920, the last peak year, by 18 per cent. But, as already shown, thus far this year, measured by carloads the freight service rendered has exceeded that of 1920 by only 7 per cent. Under existing business conditions the railways probably would handle at least 15 per cent more freight business in 1923 than in 1920, instead of 7 per cent more, if they could secure sufficiently intensive utilization of the facilities they have, or had needed additional facilities.

The shortage of transportation which now exists is not due to failure to use the facilities available as efficiently as those available 10 years ago were used. The statement issued by the American Railway Association last week mentions that the aggregate carrying capacity of freight cars increased in the 10 years 1912 to 1921, inclusive, almost 23 per cent, and the aggregate tractive power of locomotives almost 41 per cent. In the 10 years ending with 1912, however, both the tractive power of locomotives and the carrying capacity of freight cars increased over 100 per cent. The fact appears to be that the country is today offering the railways approximately 60 per cent more freight business than 10 years ago, and that they are trying to handle it with only about 23 per cent more freight car capacity, about 41 per cent more locomotive power and other increases of facilities in proportion. They are handling much more business in proportion to the capacity of their equipment and other facilities than they were 10 years ago, and are still unable to meet the demands without the adoption of extraordinary measures.

It was to adopt such measures that their meetings were held in New York last week. At those meetings the railways pledged themselves by individual and co-operative action to do the following things, among others: (1) Reduce freight cars awaiting repairs to 5 per cent and locomotives awaiting heavy repairs to 15 per cent of the total number by October 1. (2) Store their own storage requirements of coal by September 1. (3) Increase the average miles that cars are moved daily to 30 miles. (4) Try to increase the average loading of loaded cars to 30 tons. (5) Restrict power and equipment used in railroad construction and maintenance to a minimum after September 1 so that the maximum amount may thereafter be available for commercial purposes. (6) Load, move, and unload cars carrying company material as expeditiously as possible. (7) Comply promptly and fully with directions of the Car Service Commission regarding the distribution of cars, and promptly put out embargoes against cars and freight that they cannot promptly move.

They also appealed to the shippers and consignees of the country to co-operate with them in the following ways:

(1) By moving coal and ore via the Great Lakes in the largest possible quantity early in the season; (2) by shipping road and building construction material as early in the season as practicable; (3) by loading all cars to maximum capacity, loading and unloading them promptly, and providing more adequate storage facilities for themselves.

There is no reason to doubt that the railways will fully and energetically carry out the program they have adopted, or that they will secure the active co-operation of shippers and consignees wherever the latter are given a clear understanding of the situation. To make shippers and consignees, and especially those in rural towns and on the farms, understand the situation and why it is to their interest to co-operate, will require much work, but it is one of the most important parts of the program, and one which each individual railroad management should make itself responsible for carrying out. Educational work among all classes of shippers regarding this matter will be highly beneficial in at least three ways: first, it will increase the business moved; secondly, it will bring home to them a realization of the true character of the present transportation situation, and the fact that a fair policy of regulation of rates is needed to remedy it; and, thirdly, it will make every man who actually co-operates with the railways feel more friendly to them.

There can be no question that the carrying out of this program will cause the amount of business moved to be larger than it otherwise would be, and it will, therefore, be of benefit to both the railways and the public. On the other hand, the available facilities of transportation cannot be efficiently enough used to prevent a shortage of transportation throughout the year if general business activity continues to increase as it apparently will. Furthermore, if past experience may be taken as a guide, freight business will continue to increase in 1924, and there is a limit to the additional business that can be handled without a corresponding increase in the capacity of tracks, terminals, locomotives and cars.

In the statement issued in New York last week on behalf of the railways, it was shown that in the 14 months ended March 15, 1923, the railways purchased 224,000 new freight cars, of which 117,300 have been delivered and put in service and 4,219 new locomotives, of which over 2,100 have been put in service. This left over 106,000 freight cars, and over 2,000 locomotives still under contract. In addition, the railways spent \$195,000,000 for trackage and other facilities in 1922, and have authorized expenditures aggregating \$425,000,000 for trackage and other facilities in 1923.

In view of the fact that the average net return earned with the last two years has been extremely small, and that the return being earned now is nowhere near as large as is needed, the capital expenditures that have been made and that are planned are not only gratifying, but even surprising. It would be easy, however, to overestimate the increase in the capacity of the railways which will result from these expenditures. The expenditures for trackage and other facilities, excepting equipment, will effect a net increase in capacity. A large part of the expenditures for equipment have been and will be made merely to replace equipment which has been or must be retired. The statistics of the Interstate Commerce Commission show that in spite of the

increase in the new equipment put into service in the year 1922, the number of locomotives and cars retired in that year exceeded the number acquired. In January, 1922, the commission's statistics show, the Class I railways owned 2,329,081 freight cars and 33,034 freight locomotives. In January, 1923, they owned only 2,307,681 freight cars, a decline during the year of about 21,400, and only 32,922 freight locomotives, a decline of 112. These figures indicate that in the year 1922, while over 77,000 new freight cars were put in service, more than 100,000 were retired, and that the number of locomotives retired correspondingly exceeded the number put in service.

The cars and locomotives put in service undoubtedly have more carrying capacity and tractive power than those retired, but it is evident that the net increase in the service rendering ability of equipment during the year was small. Furthermore, while there are now under contract unusually large numbers of additional cars and locomotives, it is also true that there are abnormally large numbers of cars and locomotives that are unfit for service and ought to be retired. Therefore, while the expenditures authorized for equipment and other new facilities are the largest in years, it is evident that when they have all been made, the railways will only have begun to remedy the shortage of transportation which has accrued within the last 10 years.

The facts clearly show three things. First, the most efficient use possible must be made of the existing facilities this year unless the country is to suffer enormous losses due to the greatest shortage of transportation ever experienced. Secondly, the railway managements, in spite of very unfavorable financial conditions in the industry, are making and authorizing expenditures to remedy the shortage of transportation which are not inspired by the net return they recently have been, or are now earning, but by the hope that a policy of regulation will be followed which will vindicate the confidence they are showing that the constructive provisions of the Transportation Act will be preserved and carried out. Third, the adoption of radical railroad legislation when Congress meets would prove that the confidence in the future now being shown by the railway managers was misplaced and would speedily bring to a stop the policy of expansion of facilities upon which they have embarked.

Genuine progress is being made in the movement to effect a greater degree of standardization in lumber practice under the sponsorship of the United States

#### Progress in Lumber Standardization

Department of Commerce. This is evidenced by the recent action of the National Lumber Manufacturers Association's standardization committee in reaching an agreement as to the standard finished sizes of lumber as follows: "That 25/32-in. shall be the standard finished size, surfaced two sides, of all grades of 1-in. lumber, kiln dry basis, and 1 5/8-in. as the surfaced thickness of small dimensions." That the committee's conclusion carries weight is attested by the fact that its membership represents 90 per cent of the lumber manufacturing capacity of the country. In fact, it may be said that its conclusion represents the manufacturers' decision as to the most economical and practical utilization of forest products. It may seem at first thought that the determination of only two dimensions represents exceedingly small progress, but in view of the im-



portance of the two lumber sizes involved, particularly the one-inch material which is used so extensively in buildings and comprises a large part of the lumber used in car construction, the committee's decision assumes greater importance. Those responsible for the utilization of lumber on the railroads may well take heed of this action as a step forward in a movement for greater standardization in which the railroads as large users of lumber are taking an active part.

On a single track—or double track if there is much passenger business—the normal interval of trains is *not* that

**The  
"Bunching"  
of Freight Trains** maintained by the automatic block signals. Trains cannot be operated with this frequency without causing congestion and excessive delays at meeting and passing points. On a single track line, if terminal A sends out its eastward freight trains in "bunches" of four or five separated only by short intervals and if terminal B similarly dispatches its westward trains, obviously there will be heavy delays to some of the trains when the bunches meet. Similarly, on a double track line a bunch of freight trains cannot clear the line to allow a passenger train to pass without heavy delays either to the passenger train or to some of the freight trains. In other words *when trains are "bunched" out of terminals they have to assume their normal interval out on the line.* This normal interval is governed by many factors—among them the length and spacing of passing tracks, the grades encountered, the tonnage of trains, etc. The bunching of trains out of terminals increases average road time—which often means overtime; it complicates the dispatcher's work and causes dissatisfaction on the part of the train crews; it keeps locomotives on the road which might profitably be kept a little longer in the enginehouse; it makes for congestion at some points on the line and idleness at others. Bunching is generally unnecessary. It can be done away with almost entirely. For six years the Buffalo, Rochester & Pittsburgh has operated all its freight trains on non-timetable schedules which are distributed throughout the full 24-hour period to permit of a maximum utilization of facilities. If a train is not available for one of these schedules, it is not run, but no train is run except on one of the schedules. The result is that bunching and other evils of the haphazard operation of freight trains have disappeared, bringing a saving of from one to two hours in the average road time per train over divisions about 100 miles in length.

One of the most interesting examples of the way in which machinery saves labor is to be found in the up-to-date pattern shop.

#### Pattern Shop Machinery

Unfortunately, many railroad pattern shops cannot truthfully be called-up-to-date as regards machine equipment, and outside of a few common tools, such as planers, power saws, drilling and mortising machines, most of the operations involved in making patterns are performed by hand. Skilled labor is required and it frequently takes weeks to make some of the larger, more complicated patterns. The consequent expense and delay in securing castings is readily appreciated and this expense and delay can be greatly reduced by the use of labor-saving machinery, such as the variety saw bench, power-sanding machines, portable hand planers and jointers, and universal wood-milling machines. The latter type of machine in particular is a great potential labor-saver in the pattern shop where it performs the same function as the milling machine in the metal-working shop. A set of core boxes for a pair of locomotive steam pipes, for example, can

be constructed with the aid of this machine in fifteen hours, fifty to sixty hours being required where the work must be done by hand. For pattern and core box work, grooving, jointing and general pattern work, the wood-milling machine is especially adapted. It can cut core holes to a uniform depth and equally divided in a fraction of the time formerly required by hand. By means of the universal dividing head, gear pattern teeth can be shaped quickly and accurately with the proper allowance for draft. In a specific case thirty thousand dollars worth of patterns had been destroyed in a fire and this wood-milling machine easily paid for itself in restoring the patterns. On one set of locomotive patterns alone it is said that over six hundred dollars was saved. The wood milling machine is mentioned in this case because it is a typical example of what can be accomplished with modern machinery in saving time and labor in railroad pattern shops. By having the foreman go over the drawings with the pattern maker on every job and pick out the work that can be done on the miller, this machine can be kept busy nearly all the time in both the large and medium size pattern shops.

During 1922, the Illinois Central reduced its loss and damage claims from \$2,449,275 to \$1,232,681, or nearly 50 per

#### Saving Money With

#### Motion Pictures

This is a remarkable record and worthy of the heartiest commendation. The part which the use of motion pictures played in this campaign is evidence of the fact that the Illinois Central is not stopping at merely adopting the usual measures to lower expenses. It has recognized an opportunity and used it. The official photographer was instructed to find the causes of excessive damage to freight and to record them with his camera. The result is a pictorial collection of "Do's and Don'ts" for all employees directly connected with the movement of freight. The films which have been made go straight to the heart of the freight damage problem—inefficient handling. They make plain to the literate and illiterate alike the costly and dangerous methods which are in daily practice in the freight houses and yards throughout the country. They show what is wrong, why it is wrong and also what is right. By broadcasting these pictures to every freight house along the line an immediate and marked improvement was secured. As has been stated, a saving of over \$1,000,000 was effected in one year. The details of what the Illinois Central has accomplished with these pictures appear on another page of this issue. It will repay every railroad whose loss and damage claims are a burden—and whose are not?—to investigate for itself the money saving possibilities in the use of motion pictures.

## An Opportunity to Restore Wage Differentials

IN MANY LOCALITIES the railways are now facing a shortage of labor for construction and maintenance of way work. This condition will become more severe in the industrial centers and will spread into the rural communities as the highway and other seasonal building programs open. The labor required for this class of railway work is largely competitive, flowing from one industry to another as the inducements vary. Other industries are facing this same condition, as evidenced by the announcement of the United States Steel Corporation on April 9 that the wages of its employees will be increased 11 per cent on April 16. While the railways cannot meet all competition of this character, they cannot ignore periods of generally rising wages

and must adjust their rates, particularly for unskilled labor, to changing conditions in order to secure or to retain the number of men required. Facing the growing demand for labor which is now developing, a number of roads have already announced increases in wages while others are contemplating this action.

In determining the new rates which they will offer, the roads now have an opportunity to correct an adverse condition which was forced on them during federal control by substituting for the uniform rate, applicable alike in large centers and rural communities, a graduated scale which recognizes differences in the wages paid in these communities in other industries and variations in the cost of living. No greater injustice was done to the roads and to the employees alike, than the establishment of the flat wage for all employees, which added unnecessarily to the cost of railway operation and discriminated against the employees residing in communities where the cost of living is high.

In fixing their new rates, the roads have the opportunity to establish wages on a more equitable basis. At the present time the widespread industrial activity has created an abnormal demand for men in the larger centers which is forcing wages to a higher level. The roads must compete for the men they require in these areas and must pay the rates necessary to get them. On the other hand, the payment of these same rates to men in smaller communities is unnecessary and creates a disturbing factor in the industrial life of these communities. By giving careful consideration to the relative needs of their employees, the roads can do much to establish confidence in their desire to be fair, which confidence will do much to reduce a labor turnover that will be high at best.

## The Public's Use of Railway Statistics

THERE APPEARED in last week's issue of the *Railway Age* an editorial entitled "An Interesting Development in Annual Reports" dealing with the brief preliminary statements of 1922 operating results of the Rock Island, the Pere Marquette and the Kansas City Southern. In this editorial the point was made that these statements—consisting only of from four to 12 pages—contained as much information about the properties with which they dealt as do the complete annual reports of most companies in other lines of business. The question was suggested as to whether the majority of the stockholders of these railway companies would be satisfied with the brief statements or would still desire to have the complete annual reports available a few weeks later.

The question thus suggested is important because it brings up the entire matter of the relative amount of operating and earnings data made available to the investor or to the public generally by the railroads as compared with that made available by companies in other lines of business. Railway men, we imagine, do not often realize how much greater is the volume of data published regarding railway activity than is published regarding the operations of industrials. They know only too well that railways have to compile and submit to the Interstate Commerce Commission a vast array of figures covering operations for the year, for the month and for special periods or purposes of one kind and another. It is sufficiently well known also to be axiomatic, that there is no industry in the United States concerning which the public is kept as well informed as is the case with the railroads. Nevertheless, we think that railway men would have a keener realization of the situation if a comparison something like this were presented: The Rock Island preliminary statement of 1922 earnings consists of three 9 x 12 in. pages. This statement is, as has been noted, equivalent in size and content to the annual statements of the large number of the in-

dustrial companies and such statements represent practically the entire data which the industrial company stockholder will have made available to him until the next annual statement a year later. On the other hand, the array of data to be made available for the stockholder or other person interested in the Chicago, Rock Island & Pacific will include in addition to the three-page statement here under discussion, the complete annual report which will probably consist of about 60 pages in which there will appear operating data of wide variety and in great volume. Further than that, he will have made available to him also each month throughout the ensuing year a statement of gross and net income, which statement he will, in all likelihood, regard as the most valuable of all the material offered for his guidance insofar as Rock Island is concerned. There will also be published, in some form or other, a large volume of monthly operating statistics, although inasmuch as these are compiled for other purposes, it is not a certainty that they will prove of great value to him. There will also be available such information about Rock Island as will be brought out at rate hearings, consolidation hearings, etc., depending upon what happens to be the leading question at the time. The same information made available about the Rock Island will be available practically in like degree for any other road. Its volume will be out of all proportion to that made available for even the largest industrial concerns. The United States Steel Corporation or the American Telephone & Telegraph Company may, perhaps, be considered exceptions, but there are few others.

There is nothing new in the situation as pictured. It is merely one of the natural results of commission regulation of railways as it has been worked out in relation to the requirements for uniform accounting, uniform statistical reports and the desire for full publicity generally. The unfortunate feature is that even though there is much more known to the public about railway operations than there is about the operations of industrial companies generally, the railways stand in less favor both among investors and the public. Indeed, the very fact that so much is known about the railways and, therefore, of their recent hardships, may be the very reason for the lack of favor towards them. The railways presumably can do very little as regards the volume of statistics which are made available concerning their activity. It is difficult to understand how they could desire to do anything about it—as considered, be it noted, from the standpoint of volume alone—for the reason that the trend of the times is towards greater publicity rather than less. There is always the point, also, that the statistics must be compiled in any event both for purposes of regulation and for the ordinary purposes of management. We believe, however, that the subject is one that deserves some attention. The public seems to have an uncanny way of reading into the figures things which often are not there. If no better case is readily brought to mind, one can instance the recent outburst of Senator Couzens, the latest example of using the figures incorrectly as an indictment of railway operating efficiency.

It is apparent that what is needed is, of course, proper statistics, the term in this case meaning figures painting a true picture and, insofar as possible, not permitting of incorrect application or use. Another very desirable feature would be more adequate interpretation, which again brings us back a thesis previously presented in these columns to the effect that a page of interpretation is often of far greater value than columns or pages of figures. Whatever the remedy may be, there is certainly some remedy needed. In the present state of affairs the railways are too often receiving more harm than good from the large volume of data made public concerning their operations. The railways have been giving a great deal of attention of late to the general problem of the statistical requirements of the Interstate Commerce Commission and other public regulatory bodies. We wonder if the particular phase of statistical compilation herein dealt with was one of the problems considered.



## Railway Supply Companies Should "Get into the Game"

THE PROSPERITY of the railways has depended for years, and will depend in future, chiefly upon the way they are regulated. The prosperity of many business concerns, large and small has depended and will continue to depend directly upon the prosperity of the railways. The railways normally buy equipment and supplies which, at present prices, cost approximately \$2,000,000,000 a year. They spend, at present prices, over a half billion dollars a year for fuel. When their earnings are good they make large purchases, and all the various concerns which directly and indirectly depend upon them for business benefit. When their earnings are poor they greatly curtail purchases, and the business concerns which depend upon them for business suffer adversely.

These facts show that the many concerns for which the railroads afford a market are quite as vitally affected by the railroad situation as are the managers of the railroads and the owners of their securities. Therefore, in their own interest these concerns should engage as actively and energetically in helping create a sound public opinion regarding railway matters as should railway managers and security owners. The Railway Business Association is an organization composed of manufacturers of railway equipment and supplies which was formed to promote better railway regulation and which has done excellent and effective work. There is, however, a great deal that could be done and ought to be done along this line by individual concerns that depend chiefly for their business on the railroad market.

We have recently received letters from officers of two companies that sell to railways who have pointed out some ways, and one in particular, in which such concerns can promote their own interests by helping the railways. We refer to Henry F. Gilg, sales manager of the Penn Iron & Steel Company, and A. E. Pratt, manager of the railroad department of the National Carbon Company. They have called attention to the fact that railway equipment and supply companies have hundreds of salesmen who in their travels throughout the country come in contact with all classes of people and who, if furnished the necessary information and requested to do so, could effectively combat the anti-railroad propaganda which is constantly carried on. For reasons already mentioned there is just as much occasion for representatives of railway equipment and supply companies as for representatives of the railways to do this. Samuel M. Vauclain, president of the Baldwin Locomotive Works, is now setting an example that might well be followed by many other men whose business success depends upon the railroad market by delivering a series of addresses on the railroad situation in various cities.

The railways at the present time are making extraordinarily large expenditures for equipment and supplies and therefore most of the concerns that depend upon them for business are comparatively prosperous. But the railroads are menaced by radical agitation for legislation which, if adopted, would be disastrous directly to them and indirectly to every business concern for whose products they are the principal or sole market. The railways themselves ought to be doing more than they are to present their case to the public, but there is no more reason, from the standpoint of self-interest, and perhaps even less reason, why they should be combating the anti-railroad propaganda than why the various business concerns that sell equipment and supplies to them should be doing so. A great struggle to determine the future of the railroads is going on. Every railway equipment and supply company in the country ought to get into it. No such concern which does not get into it will do all it can and should to protect and further its own interests.

## Letters to the Editor

### Old-Fashioned Conditions Still Obtain in New Jersey

SOUTH TRENTON, N. J.

TO THE EDITOR:

You will recall that a few years ago the enterprising State of New Jersey adopted a law requiring the railroads within the State to transport without charge certain officers, agents and employees of the Commonwealth. Although from the Woolworth tower it is possible to see a good portion of the outdoors of this enterprising State; and it may seem presumptuous for me to venture to tell the news to such a well equipped news gatherer, I think it is my duty to inform you about the beneficent effects of this law. You, no doubt, can see from your windows a large part of the outside of New Jersey, but you will have to penetrate into the minds of the people if you are going to get at the essence of things.

The fact is that through the instrumentality of this truly conservative statute—conservative as opposed to socialistic—large numbers of Deserving Democrats and Reliable Republicans are revelling in the unexampled delight of riding almost anywhere they please on an annual pass; and it sometimes seems as though the good old days had actually returned.

Some inquisitive persons have been looking up the names of these all-the-year-round joy riders. It appears that this law providing railroad transportation for the account of the State specifically includes "the members and officers of both Houses of the Legislature;" and there are found outstanding at the present time 481 certificates; and, in the words of one of the reporters, the question of what constitutes an officer of the Legislature proves to be capable of a very broad construction.

The clerks of committees are prominent in the list. Some of these clerks appear to be former state officers, judges, etc. and one man, formerly a clerk of the Supreme Court and now clerk to the House committee on elections, is said to have very few duties to perform. One committee has two clerks holding passes, although no other evidence was found that these persons ought to be called clerks.

"The emergency chaplain," whose residence is near Trenton, is one of the pass riders with a unique title. It appears, however, that his duties are very light, for the Legislature, like many individuals, does not indulge in prayer except in emergency. This item refers apparently to the House; the Senate has a regular chaplain. In connection with these sacred officers, another man has a pass as clerk of the clergy committee. What this committee does is not apparent. Probably it sees that prayers like those which recently resounded in the legislative halls of Massachusetts and Colorado, slamming the wrong political party, or otherwise offending sensitive members, shall not find voice in New Jersey.

Still another curious case is that of a man whose pass describes him as "clerk to a committee" but with no committee named. This man is a secretary of the Republican state committee.

As New Jersey's law makers have, in many fields, blazed the path for the legislators of other states (in favoring the trusts and other octopi, knocking out the Volstead law and such like philanthropic directions) it may be that this modest and obscure statute will prove to be a boon to the politicians of many states where now the humdrum conditions of everyday life are breaking the backs of the people.

E. MARJORIBANKS.

## Checking Fuel Performance

CHICAGO.

TO THE EDITOR:

On page 302 of your issue of February 10, you published an editorial entitled "Individual Fuel Records," with which I am in accord, even as to the advisability of establishing a system through which it is possible to obtain an individual fuel record. But did you stop to consider what this means on the average railroad?

There are so many variables entering into the fuel problem that a comparative performance sheet has little, if any, actual value insofar as enabling the responsible officer to place his finger on the coal wasting individual unless you also subdivide the record by trains, engines, enginemen and firemen. You mention a record of performance on individual runs. In this day of pooled power how would you subdivide this? Would you classify the performance by engines or men?

For instance, we may note that engine No. 4444 shows a consistently bad record regardless of engine crews, or Engineman Smith may show a uniformly high coal consumption regardless of engine or fireman. Engineman Smith may be hauling his train over the road in from one to two hours less time than Jones, Brown or Green. Again, engine 4444 may only show a high fuel consumption when either Engineman Smith or Fireman Brown, or both, are on it. Where do we begin and where do we end with our comparisons?

Do you grasp the magnitude of the task you set when you propose individual records? True, where engines are assigned to certain men or to certain runs a fairly accurate comparison may be made, but even then unless converted into terms of ton miles per hour, our yard stick is a poor thing to measure with.

How often would you get out the individual performance sheet. Would it be daily, weekly or monthly? The only object in rendering a comparative statement at all is to enable one to place his finger on the offender and apply corrective measures in order to stop the waste of fuel. If this statement is compiled weekly or monthly, have we accomplished our object?

Is it not therefore necessary to set up a potential indicating what the consumption of fuel should have been under the varying conditions and check each run against this potential as soon as completed? If this is granted, then weighing or measuring devices are required at all coaling stations, accurate tests must be conducted to establish the potential, tonnage must be carefully computed, etc. This is not an impossible task; the writer can point to one road in the middle west where just such a system is used. Admitting that this can be done, with fuel at its present price do you think the system will be adopted on the average railroad?

Perhaps your editorial was intended as the forerunner of such a campaign. If so, more power to you, but why not start with common addition instead of beginning with differential calculus? The condition of the fire on arrival at the terminal will as a rule give a fair idea of what went on out on the road. Any old-time fireman or engineman who looks into a firebox and sees a fire that looks like a relief map of the Rocky Mountains will at once tell you that the locomotive is not properly fired. On the other hand, a thin, level fire indicates care and a desire to get the fuel value from the fuel. It requires no elaborate bookkeeping to check fires on arrival at terminals, and the record is right before the supervising officer daily. Therefore, if such a check is made of the condition of the fire on arrival, and it is seen that Smith, Brown and Jones invariably bring in fires half way to the crown sheet—dirty, humpy, clinkered—while Green, Jenks and Robinson bring in light, level fires, does not that suggest that it might be well to instruct Smith, Brown and Jones or at least find out why this difference and if due to the condition of the locomotive, correct the locomotive?

EX-FUEL SUPERVISOR.

## An Inoculation for Criticisitis

CHICAGO.

TO THE EDITOR:

I have been much interested in following out a thought suggested by a couple of sentences in a communication published in your issue of March 31 under the heading "Relations with the Employees and the Public." Referring to the desirability of letting employees know the cost of the things they work with and the public know the cost of the things with which it comes in contact with, the writer says:

"Dining cars, with their high prices, are a constant source of irritation to the traveling public. A small note printed on the menu, giving the cost and any other item of interest, would show that there is justification for the prices charged and that diners are run for the convenience of the patrons and not for profit."

I believe these two sentences contain a germ that with a little careful culture can be ripened into a whole colony of "bugs" with which the traveling public and stay-at-home acquaintances might unconsciously become inoculated as a preventive of *criticisitis*. This disease is not restricted to patrons of the dining car nor to the traveling public; it is epidemic. The treatment may conveniently be administered in the dining car, in the rest of the train, or even in stations.

How many, even of the most frequently traveling public, have any idea of the amount of investment in a modern locomotive, in a dining or sleeping car, or in a day coach? One in ten thousand would be a liberal estimate. Among the general public, among those who wildly conceive the railway industry to be a fabulously prosperous institution because its statistics deal with millions, the proportion is less.

When we talk about railway investments in general we must deal with millions. That, to most of the public, is nebulous, an immense, incomprehensible abstraction. Let's get to something concrete. Every one has seen locomotives and cars. Why not in some unobtrusive way let him know that when he travels on a first-class train, there is an investment of something like a half million dollars which is at his service for two or three cents a mile, or less, if he is making a long trip? Let him know that the locomotive which takes the place of his horse or his flivver cost \$50,000 or \$60,000; that the car in which he is riding so comfortably cost more than the best mansion in his town—the banker's show place, for example. The dining car, in which he takes his meals without the loss of a minute's time, however leisurely he may be about it, cost more to build and equip than the best restaurant he has ever patronized, its menu is as comprehensive and choice as that, and as to the cost of supplying and serving food there is no comparison. Then this same train affords him sleeping quarters as costly if not as commodious as does a first-class hotel for the same rate or less, and moreover places at his service without any extra expense a baggage car which costs twice as much as his own pretty good house and which lands his personal effects at his destination without an atom of responsibility on his part. Why not tell him at every opportunity about some of these things, in units instead of in millions?

My point, suggested only in the crudest possible way, is that the education of the real public that makes a supporting or destructive public opinion, must begin with items that are within the range of the public's ordinary mental processes. We must get the public familiar with the units before we attempt to educate it in millions. Tell a bunch of the public about the trains with which it is familiar or can become acquainted, with the work of its own station, and with the activities of a single division, before we attempt to get its comprehension of the railway system as a whole. This can be done in a variety of ways, according to the ingenuity of the department charged with it. It should be done in the scriptural way—"line upon line, precept upon precept, here a little and there a little."

A. B. C.



# Grade Change Improves Helper Performance

Arrival and Departure of Trains at Terminal Also Expedited by Twenty-four Miles of Second Track

**G**RADE REVISION is commonly associated with a reduction in the ruling grade for the purpose of increasing the tonnage rating of road engines, or eliminating helper service. But on the Union Pacific a short distance west of the engine terminal at Glens Ferry, Ida., a helper

on which it was possible to establish relatively moderate gradients, except for a distance of about 36 miles in the vicinity of Glens Ferry. The ruling grades, Pocatello to Glens Ferry, will eventually be 0.5 per cent for westbound trains and 0.65 per cent for eastbound trains except between Pocatello and Minidoka where they will be 0.5 per cent. For this particular section, tonnage trains will be filled out with freight originating on various branches south of Minidoka to the rating for a 0.5 per cent grade. Between Glens Ferry and Huntington the ruling grades are 0.5 per cent in both directions.

## The Sag at Glens Ferry

In the immediate vicinity of Glens Ferry, the upland location proved impracticable, making it necessary to place over 20 miles of the line in the river valley at an elevation approximately 700 ft. lower than the general level of the plateau and requiring heavy descending grades from both



The Material in the Cuts Is of a Varied Character

grade is now being revised to coordinate it with the ruling grade which determines the tonnage road engines can handle on the other portions of the engine district. This work is being carried on in conjunction with 24 miles of double-tracking undertaken primarily for the purpose of expediting the arrival and departure of trains at the terminal.

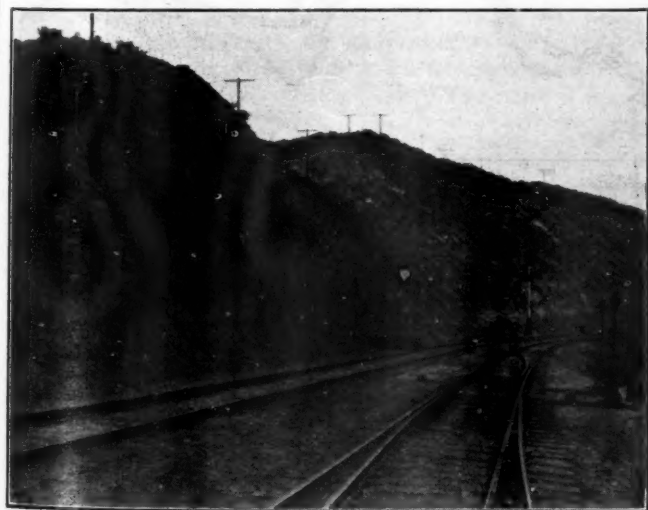
The main line of the Union Pacific's Idaho division, which



Along the Snake River, East of Glens Ferry

the east and the west. The westbound descent from Ticeska to King Hill, seven miles, has maximum grades of 1.72 per cent while the eastbound descent from Reverse to Medbury, which is eight miles long, has maximum grades of 2.0 per cent. These grades are operated with the aid of helper engines, and are both being revised to 1.45 per cent so that expensive and slow speed Mallet helpers be replaced by more economical and faster power.

This break in the general location of the Idaho division is known as the Glens Ferry hole and has imposed serious obstacles to the effective operation of the division. The westbound ascending grade, because of its steeper gradient and greater length, is the most serious since even with a Mallet pusher, the freight train load is limited to the tonnage which the road engine and a pusher can handle on the hill rather than the tonnage which the road engine can haul over the rest of the division. But of equal importance has been the effect of the pusher operation in delaying the train movements over the two engine districts. The slow speed on the hills, together with the occupancy of the single track line by the pusher return movement, has greatly delayed the arrival and departure of trains at the Glens Ferry terminal and

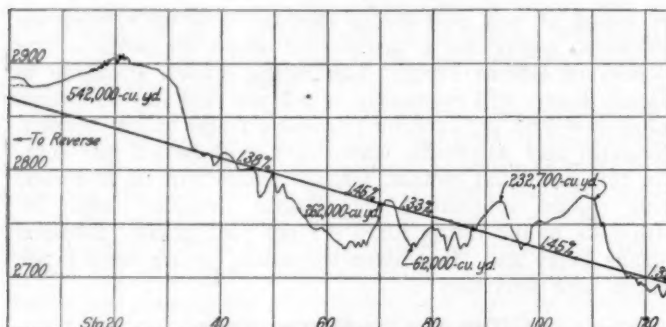


One of the Cuts Uncovered a Chalk Formation

extends from Pocatello, Ida., to Huntington, Ore., a distance of 327 miles, is divided at Glens Ferry into two engine districts, 160 and 167 miles long, respectively. For nearly the entire distance between these terminals, the line occupies a location generally parallel to the Snake river, but well away from the river valley on a relatively level plateau that was found reasonably favorable for railway construction and up-

with engine districts 160 and 167 miles long, respectively, it has been exceedingly difficult at times to get freight trains over the districts within the 16-hour limit. It is concluded from careful study of train movements and effect of second track sections now in operation that the proposed improvements will eliminate overtime almost entirely.

As a means of correcting this condition, the Union Pacific



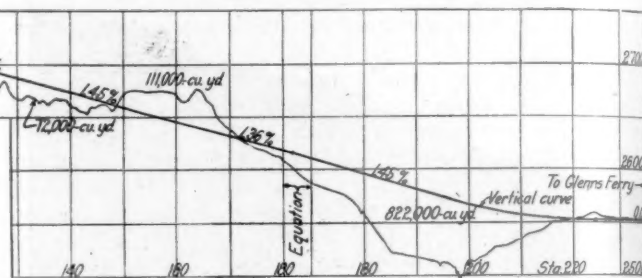
Profile of the Double-Track Relocation Between Hammett and Chalk

has undertaken a progressive plan of improvement throughout the limits of the Glens Ferry hole and to date approximately three million dollars has been appropriated for this purpose.

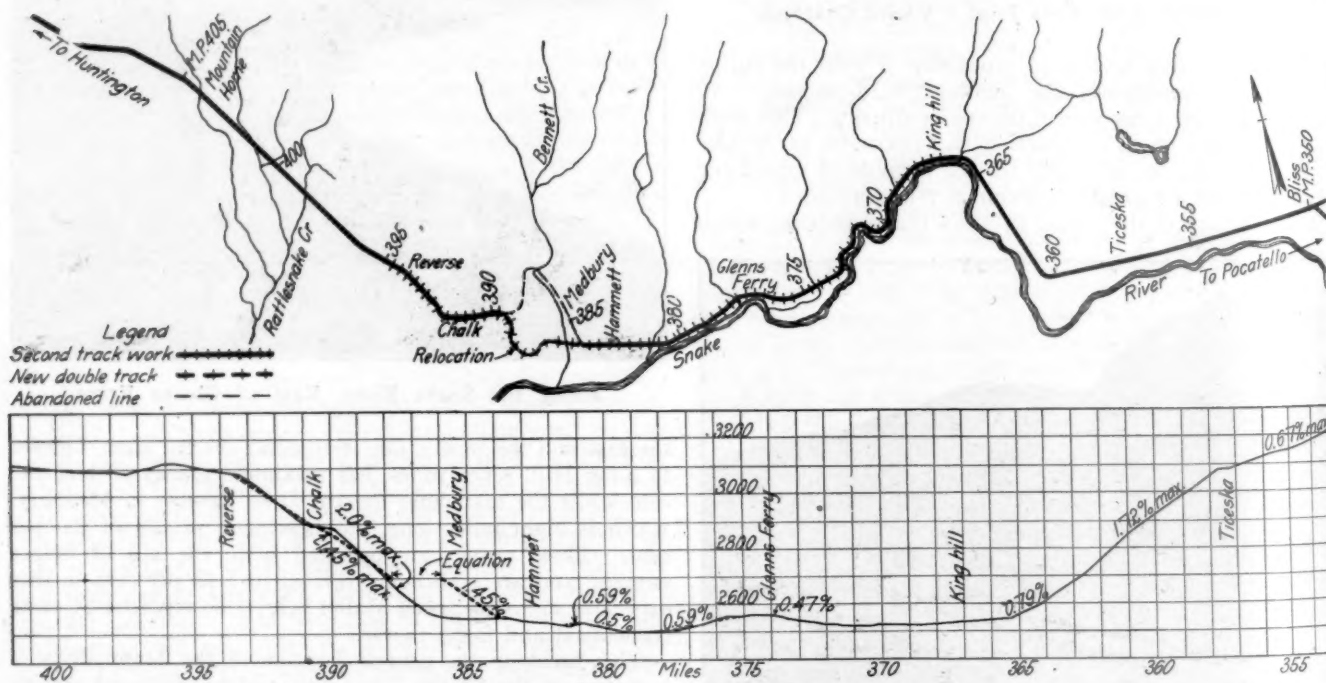
The first step in the improvement plan provided for the double-tracking of the 16 miles of bottom location between King Hill and Hammett, with a few minor grade revisions. The work within these limits was undertaken first because

1.8 miles. The apparent enigma of a grade reduction, combined with a saving in distance, is explained with the help of the map and profile which show that the old line contained a considerable amount of slack grade for a distance of almost three miles beyond the point where the new line leaves the old one just west of Hammett.

The new grade will permit of considerable improvement in the operating results. It will enable the Mallet pushers to be replaced by those of the Santa Fe type and also effect an increase in train loading from 2,750 tons to 2,950 tons, an amount readily handled by the Mikado road engines over the remainder of the engine district. It will also effect a considerable reduction in the number of passenger trains requiring helper service since the new grade will enable a Pacific type engine to handle nine passenger cars without



assistance, whereas at present any train in excess of six cars requires a helper. In addition, the second track will greatly expedite train movement by the elimination of interference from the return movement of the helper engines, while the



it was relatively light and could be completed quickly, thereby offering the quickest relief from the congestion at the Glens Ferry terminal.

The second step provides for the double-tracking of the western ascent from Hammett to Reverse, approximately nine miles, together with the reduction of the grade to a maximum of 1.45 per cent. This involves the construction of a double-track line on a new location for a distance of 4.7 miles, to take the place of 6.5 miles of the old single track line which will be abandoned, thereby effecting a saving in distance of

slow up-grade movement will be expedited by the provision of automatic block signals arranged for a close spacing of the trains.

#### Work Between King Hill and Hammett Completed

The second-tracking of the line between King Hill and Hammett was started on June 15, 1922, and the first section of this improvement, from Glens Ferry to King Hill, was turned over to the operating department on November 15. The remaining portion was ready for use on December 31.



Throughout a large part of this valley location the railroad lies against the base of bluffs which form the north face of the Snake river valley. The characteristics of the country traversed by this portion of the river include a generally level deposit of clay and sand, subsequently covered by a blanket of lava from 12 to 15 ft. thick. The process of erosion by which the river valley was cut through this formation caused the lava to break off in fragments of various sizes which mingle with the other debris in the talus at the foot of the bluffs. This describes the material which is most frequently encountered in the cuts along the railroad, although excep-

culty is evidenced by the prices provided in the contract for the various classifications; i.e., earth, 20 cents; loose rock, 35 cents; solid rock, 75 cents; lava rock, \$1.45. While this lava rock was encountered in largely varying quantities, in one cut it ran as high as 90 per cent.

#### Methods Were Varied to Meet Conditions

The construction methods varied with the material encountered. A chalk cliff east of Glenss Ferry was taken out with a vertical face 31 ft. from the center line between tracks, thus affording room for a steam shovel inside of the operating track with ample clearance for the jack arm. In another cut, considerable water (seepage from irrigation canals above) was encountered and to avoid trouble with soft track, the cut was taken out three feet below grade and backfilled with coarse material to insure drainage.

The most important grade change covered a distance of 16,000 ft. immediately west of Glenss Ferry. This comprised a cut below the grade of the old line for a distance of 9,000 ft. with a maximum depth of eight feet, beyond which there was a raise of grade of 7,000 ft. with a maximum lift of eight feet. This grading amounted to 82,000 cu. yd. in excavation and 77,000 cu. yd. in fill. The cut was taken out alongside the operated line to accommodate one track and the fill was likewise completed to the new grade for a single track. Operation was then transferred to the new grade so that the cut and the embankment could be widened for a second track.

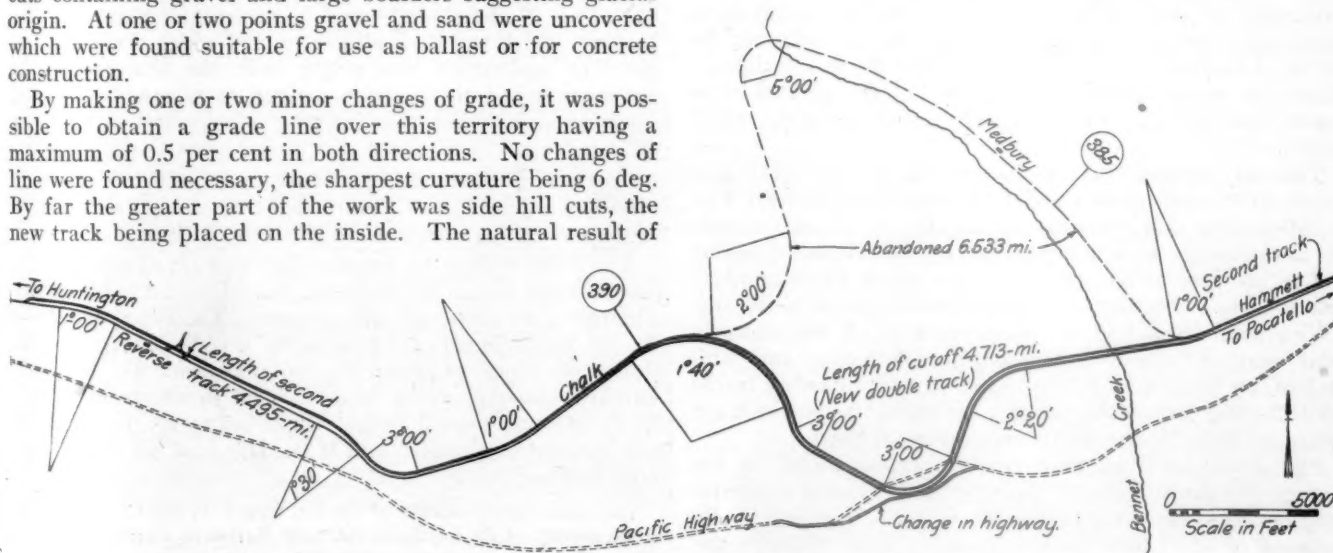
All of the grading was handled through a general contract with the Utah Construction Company, Ogden, Utah, which handled three miles of the work with its own forces and sublet the remaining portion to four sub-contractors. The bridge work was relatively light and was done by company forces. Several small waterway structures had to be widened for second track, of which a 30-ft. deck girder span and a 30-ft. arch were the most important. Just east of



Fragments of Lava Rock Were Mingled with Other Debris in the Cuts

tions occur in several places in the form of chalk cliffs and cuts containing gravel and large boulders suggesting glacial origin. At one or two points gravel and sand were uncovered which were found suitable for use as ballast or for concrete construction.

By making one or two minor changes of grade, it was possible to obtain a grade line over this territory having a maximum of 0.5 per cent in both directions. No changes of line were found necessary, the sharpest curvature being 6 deg. By far the greater part of the work was side hill cuts, the new track being placed on the inside. The natural result of



Map of the Grade and Line Revision Territory Between Hammett and Reverse

this was a considerable excess of excavation over embankment, the grading totals being 310,000 cu. yd. of excavation, 213,500 cu. yd. of fill and 132,000 cu. yd. of side borrow. These totals point to a considerable volume of waste and in one cut east of Glenss Ferry, it was found desirable to waste 50,000 cu. yd. With the exception of a very minor amount of team work, the grading was handled with steam shovels and narrow-gage cars. The lava rock, being hard to drill and breaking into large fragments requiring considerable adobe shooting, caused far more trouble to the contractor than any other material encountered. The relative diffi-

Glenss Ferry, a concrete subway with a 16½-ft. roadway was constructed for a highway undercrossing.

#### Heavy Work Between Hammett and Reverse

About a mile west of Hammett the railroad encounters a valley almost a mile wide which extends back into the hills at the right with its axis almost perpendicular to the railway location. It is occupied by Bennett creek which lies in the bottom of this valley almost 50-ft. lower than the grade of the track. Beyond the valley the land rises in a gradual, though decidedly broken, slope to the general level of the

uplands at Reverse, a distance of eight miles in a straight line from Hammett. In order to obtain a favorable crossing of the Bennett creek valley, the old line makes a detour of three miles up the valley and after traversing a horseshoe curve of 124 deg., commences the ascent on a supported grade on the west side of the valley before resuming the generally westerly direction of the line.

The new location strikes off across the valley almost directly toward the high ground with a vertical curve 2,900 ft. long ending in a 1.45 per cent grade which continues without break except for compensation for curvature over the four miles to Chalk, where it comes to grade with the old line. This location obviously leads to heavy work, beginning with a 70-ft. embankment 6,600 ft. long across the valley, containing 822,000 cu. yd. of fill and followed by a succession of heavy cuts alternating with fills of lesser magnitude, except two almost adjacent fills about a mile east of Chalk aggregating 325,000 cu. yd. The largest cut is just west of this fill and contains 542,000 cu. yd. There are two other cuts of 133,000 and 111,000 cu. yd. respectively.

Between Chalk and Reverse, the second track is generally parallel to the original line, the distance between track centers varying with the difference in elevation of the two lines. This grading, however, is all relatively light.

The total grading between Hammett and Reverse amounts to 975,000 cu. yd. in excavation and 1,336,800 cu. yd. in embankment. The material in excavation is almost entirely a soft loose clay which, in the absence of an amount of rainfall necessary to produce wet cuts, can be handled with unusual economy. This work was awarded to the Utah Construction Company in November and is being handled with standard-gage equipment operating over a construction railroad built in the general location of the new line with the advantage that the loaded movement is all downhill. The large embankment across the valley is being built by dumping from trestles in three lifts. Compensation for the vertical shrinkage is affected by increasing the height of the embankment five per cent, while allowance for side shrinkage is based upon the area of the section at the embankment, the width of roadbed being increased to allow for this shrinkage. Slopes on embankments are 1.5 to 1. On embankments higher than 50 ft., 10-ft. berms are added below the 50-ft. height.

The only structure of any importance on this work is a double 10-ft. arch culvert under the large embankment. This is 230 ft. long and contains about 1,500 cu. yd. of concrete. All of the bridge work is being done by the railroad company and in the case of the culvert, a spur track about one-half mile long was constructed to deliver the material to the site.

New main track laid in connection with all the improvement work is provided with 100-lb. CS section rail with 18 7-in. by 9-in., 8-ft. ties to the 33-ft. rail. Passing tracks 4,000 ft. long are placed between the main tracks which are spread to 26-ft. centers by 10-min. reverse curves.

The development of the plan for improvements in the vicinity of Glens Ferry, together with the actual construction, has been conducted by the forces of the engineering department of the Union Pacific System. J. P. Elliot is the construction engineer in direct charge.

**SAFETY (AND MODESTY) ON THE ERIE.**—In a letter from "A Commuter," printed in the New York Herald, it is said that the records of the New York State Public Service Commission show that in seventeen years the Erie Railroad carried 476,559,728 passengers, only two of whom lost their lives in train accidents. The writer of the letter says that he has attempted to discuss these figures with an officer of the road, but that "beyond confirming the facts as stated he would say nothing further, simply adding that such discussions were taboo in Erie official circles." This, says the commuter, "is a record to be proud of and it ought to set a chronic growler to thinking."

## C. N. R. Officers Offer to Return Grand Trunk Bonuses

**F**ORMER OFFICERS of the Grand Trunk, now in the service of the Canadian National, who received bonuses at the hands of the Grand Trunk board of directors prior to the acquisition of this property by the Canadian government, have offered to restore to the treasury of the Canadian National Railways the sums awarded to them. Meantime the Canadian government has announced its intention of appointing a royal commission to investigate the circumstances under which the gratuities were granted.

The payments were made in December, 1919, and in March, 1920, the Grand Trunk entered into an agreement not to dispose of any of its assets without the consent of the Canadian government. It is claimed in some quarters, however, that this agreement was reached some time before the date when it was made operative and that the directors of the Grand Trunk were aware of it at the time the bonuses were voted.

It is claimed, further, that the bonuses were paid from the fire insurance fund which would have reverted to the government when it acquired the property.

The action of the board of directors in voting the gratuities, especially to itself, has been widely criticized in the Canadian press and in Parliament. There has been no such criticism of the officers who received the bonuses. The Grand Trunk was going out of existence and under the new management many of the officers were scheduled for retirement. The bonuses were awarded in recognition of long and faithful service and the receipts which the recipients signed were endorsed "special gift from the shareholders."

The announcement of the government's decision to appoint a royal commission of inquiry, said in part:

"The action of the officials at present in the service of the Canadian National Railways in returning voluntarily the amounts which had been paid them, and which they had been given to understand was a gift from the shareholders, is appreciated and the decision arrived at to appoint a royal commission is in no way intended as a reflection on these officials."

The total amount paid in gratuities was \$430,200, of which \$167,800 represented the sum voted by the English directors to themselves "in compensation for loss of office."

The letter written by former officers of the Grand Trunk, now with the Canadian National, was addressed to Sir Henry Thornton, president of the company, and was signed by W. D. Robb and J. E. Dalrymple, vice-presidents; D. E. Galloway, chief assistant to the president; G. T. Bell, executive assistant to the vice-president in charge of traffic; H. C. Martin, general freight traffic manager; J. M. Rosevear, general comptroller, and H. H. Hansard, solicitor. Their letter follows:

The undersigned officers of the old Grand Trunk Company now in the service of the Canadian National Railways, having read with concern the accounts in the public press of the gratuities voluntarily given them prior to the date of the acquisition of that company by the government of Canada, under resolution of board of directors of that company, have determined, with a view of performing their full duty as patriotic citizens of the Dominion, and to preserve that confidence and respect on the part of the public without which no railway officer can efficiently perform his duties, to voluntarily offer the Canadian National Railway Company a return of the gratuities given in each case; a reasonable time to be allowed each officer to complete his payment. In taking this action, we wish to make it clear, as a matter of justice, that we admit no wrongdoing on our part, as at the time we were informed the gratuities were given by the retiring board of the Grand Trunk Railway Company "in recognition of loyal and faithful services, covering a period of many years."





The Power House at Bluestone Which Supplies Power for the Electrified Zone of the Norfolk & Western

## Electric Locomotives for the Norfolk & Western

Double Cab Is Carried by Vanadium Steel Side Frames  
with Four Pairs of Drivers in Each Frame

By T. C. Wurts

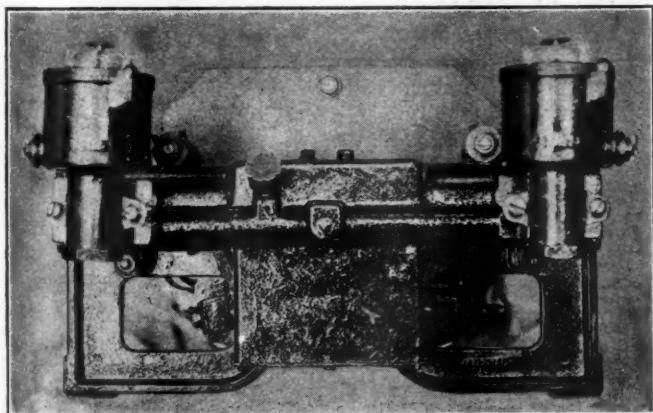
General Engineer, Westinghouse Electric & Manufacturing Company

**F**OUR NEW ELECTRIC LOCOMOTIVES have been ordered through Gibbs & Hill, New York City by the Norfolk & Western. Announcement of this order was made in the September 9, 1922 issue of the *Railway Age*. The locomotives,

The equipment in each cab will be identical, so that any two cabs can be coupled together, back to back, to form a locomotive unit.

The principal dimensions of the cab and wheel arrangement are as follows:

Wheel arrangement .....	2-8-2 and 2-8-2	
Rigid wheel base.....	16 ft.	6 in.
Length over coupler faces.....	97 ft.	2 in.
Total wheel base.....	83 ft.	0 in.
Height from rail to top of cab proper.....	13 ft.	5 in.
Height from rail to top of clerestory.....	14 ft.	9 in.

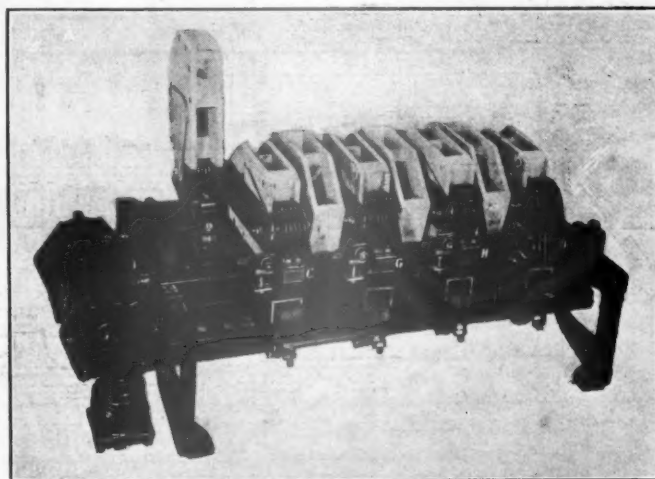


Cam Switch Group for Starting Auxiliary Motors

are being built by the American Locomotive Company and the Westinghouse Electric & Manufacturing Company and will have approximately 30 per cent greater hauling capacity than those now in operation.

The 12 original locomotives which have been in service since 1914 are of the split-phase type which take 11,000 volt single-phase current from the trolley and transform it inside the locomotive to three-phase power at a voltage suitable for the induction type traction motors. Twelve of these locomotives, when placed in operation, retired 33 Mallet type steam locomotives and in the opinion of the railway company's operating officials, more than doubled the capacity of the road.

The new locomotives, like the original ones, will consist of two cabs permanently connected to form a locomotive.



Cam Operated Switch Group for Short Circuiting the Secondary Windings of the Traction Motors

Height from rail to pantograph in lock down position	15 ft.	10 in.
Maximum width over side sheets.....	10 ft.	5 in.
Diameter of driving wheels over tires.....	62 in.	
Diameter of truck wheels over tires.....		33 in.

The design of the cab and running gear is the result of the combined study of the railway company and their con-

sulting engineers, Messrs. Gibbs and Hill. It embodies all the improvements thought necessary as a result of the present operation, and is especially designed to meet the severe service to which it will be subjected. Several unique features have been incorporated.

The cab structure is fastened rigidly to, and is carried by the side frames. This is contrasted with the previous construction of the cab supported by springs and sliding bearings. The side frames are vanadium steel castings connected by cross ties which are also used to support the heavier pieces of electrical apparatus mounted in the cab. The four pairs of drivers of one cab are in a single truck, whereas two trucks of two pairs of drivers each, connected by a mallet hinge, are used on the previous engines.

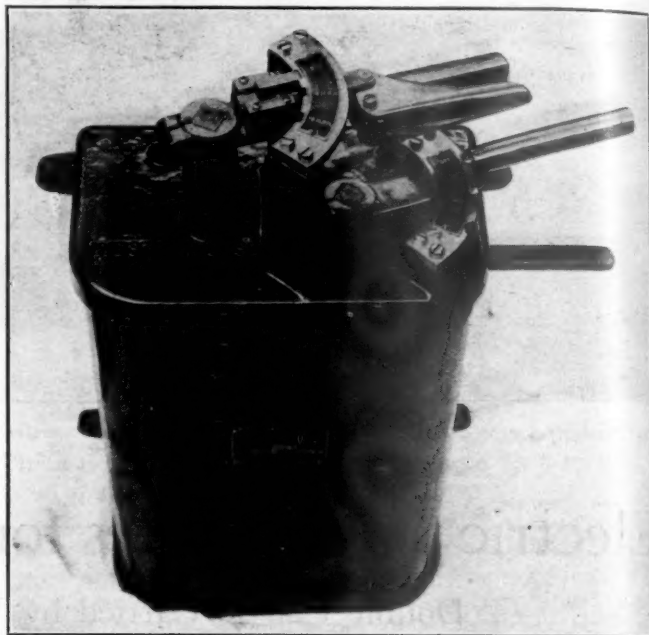
The spring suspension arrangement is of the Mikado type embodying side equalization between the leading truck and its adjoining two driving axles and cross equalization between the other two driving axles and the trailing truck.

Ease of removal of the jack shaft and its bearings is an outstanding feature of the locomotive. The jackshaft is carried in heavy bronze bearings, split vertically, which rest on a steel casting or collar. These are set in the side frames between accurately fitted pedestal ways. The collar casting itself is provided with a tie bar arranged so that the collar becomes almost an integral part of the side frame, and in no way weakens the latter's strength. This application follows closely the arrangement on the previous locomotives.

The locomotive cabs and mechanical parts are now being built by the American Locomotive Company, and when completed will be shipped to the works of the builder of the electrical equipment and the gearing, the Westinghouse Electric & Manufacturing Company, where the electrical equipment will be mounted and the locomotives tested before shipment to the railway company is made.

A flexible gear mounted on each end of the jack shafts transmits the motor torque by means of side rods to the driving wheels. The springs are inserted without initial

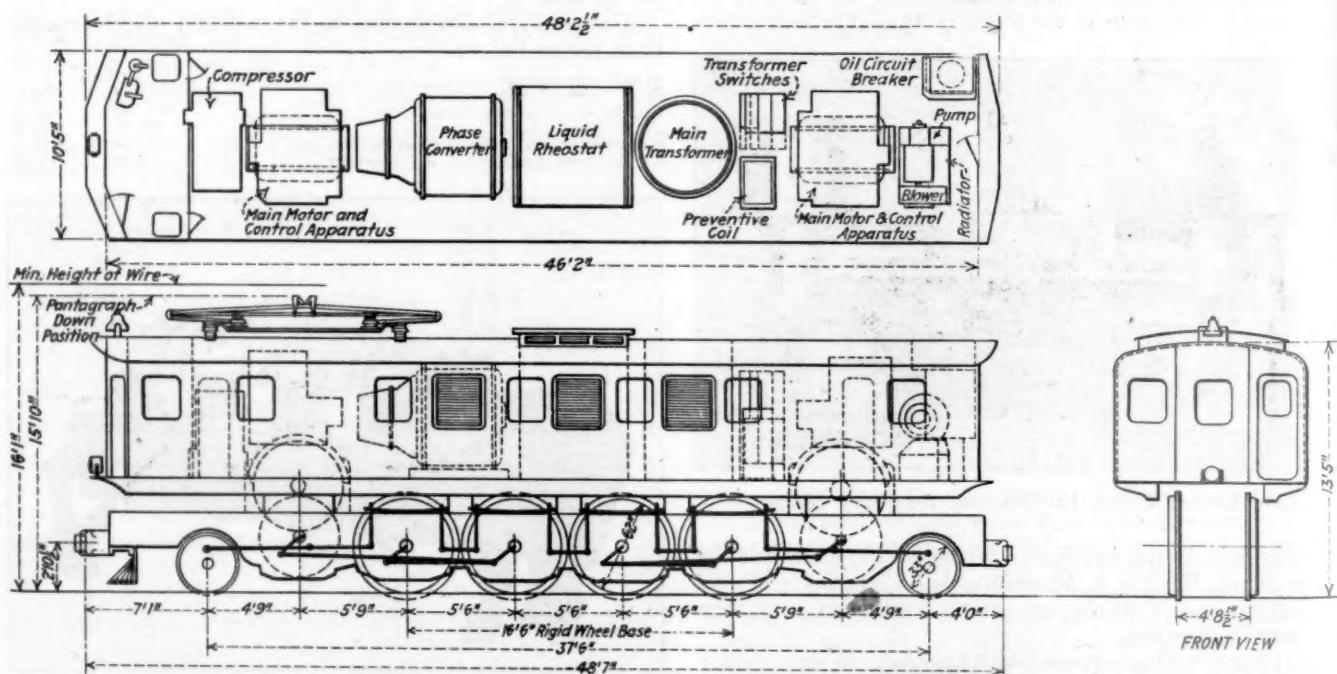
design of motors for the experimental split-phase locomotive of the Pennsylvania Railroad built in anticipation of the Altoona grade electrification. In the case of the present locomotive, however, only one motor per jack shaft is pro-



Master Controller, One of Which Is Located in Each Locomotive Unit

vided as compared with two motors per jack shaft on the previous Norfolk & Western locomotives, and on the Pennsylvania Railroad locomotives just mentioned.

Structurally, the motor is of the induction type with a



Plan, Side Elevation and End View of One Locomotive Unit Showing Location of Apparatus

compression, and are so designed that they do not become completely compressed until a torque is exerted equivalent to a locomotive adhesion of 110 per cent.

In the design of the main motors, the Westinghouse Company has followed closely along the lines laid down in their

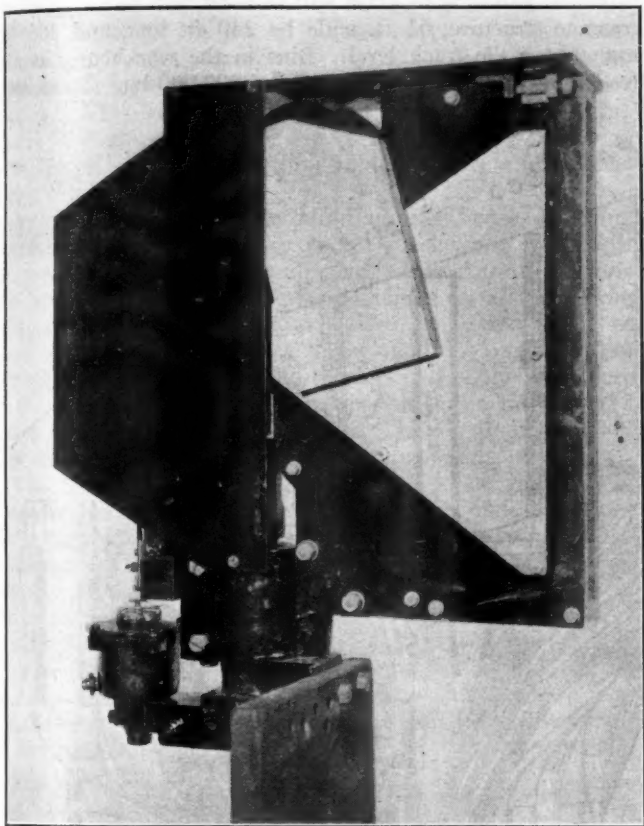
wound secondary arranged so that it can be connected for either four or eight poles, corresponding to locomotive speeds of approximately 28 mph., and 14 mph., respectively. Collector rings are provided to connect the secondary windings to liquid rheostats which provide the starting resistance. These



collectors are mounted on the ends of the motor shaft to provide ready accessibility and ease of inspection.

The nominal rating of the traction motors on the one hour basis is 1,000 hp. each. Four motors of one complete locomotive unit are capable of developing a tractive effort of 90,000 lb. continually at 14 mph., and 52,500 lb. continuously at 28 mph. On a basis of the one hour rating, the tractive efforts developed are 108,000 lb. and 63,000 lb. at 14 mph., and 28 mph. respectively.

A new and interesting feature of this locomotive is the use of an oil insulated force cooled transformer. The transformer back is cylindrical in shape with its upper end projecting slightly above the cab roof. The oil insulated type of transformer has been almost universally used in a single-phase European electrification, but up to this time the air blast



One of the Motor Switches

transformer has been the standard in this country in all trunk line installations.

The phase converter is of the synchronous type. The stator is wound essentially like a two-phase induction motor. The motor is wound for direct current excitation by means of which the locomotive power factor may be controlled so that at full load it will be approximately 95 per cent. The phase converter is started by means of a small single-phase commutator type motor mounted directly on its shaft, arranged so that when its starting function is completed, it is reconnected as a separately excited d.c. generator to furnish the current for the phase converter motor. Separate excitation for the d.c. generator is obtained from the control generator and the storage battery.

The phase converter stator windings are so arranged that one of them acts as a driving winding for the motor. The other winding has a voltage generated in it which has approximately a 90-degree phase relation with the transformer voltage. By combining this voltage with the transformer secondary voltage in accordance with the usual two-phase-three-phase connection, balanced three-phase voltage is produced at the traction motor terminals.

By means of a balancing transformer preventive coil, normal motor voltage is maintained with a 15 per cent drop in trolley voltage during accelerating, and with a drop in trolley voltage of half this value during normal running.

Cooling of the oil insulated transformer is accomplished by means of pumping the oil through a force ventilated radiator. A simple motor supplies the energy to drive both the oil pump and the blower for the ventilating air.

Ventilation of the traction motors is accomplished by a motor driven blower set for each motor. These motors are identical in design to the motor for the combined blower and pump set and to the motor driving the pump which circulates the electrolyte in the liquid rheostat, the only variation being in the shaft extension. This practically accomplishes interchangeability of all auxiliary motors.

Following previous practice on the Norfolk & Western Railway, the generator furnishing the energy for the control, charging the storage battery, and exciting the d.c. exciter for the phase converter is chain driven from the shaft of the phase converter. It has a capacity sufficiently large so that in the event of a control generator failure in the adjacent cab, one generator can furnish the excitation for both exciters.

In the design of the liquid rheostats, the Westinghouse Company has improved materially on any rheostat of this type supplied heretofore. The rheostats for both motors of one cab are contained in a common tank with a common storage supply. This insures the same electrolyte strength in both rheostats. By means of a common valve, motor operated, and controlled from the master controller, the electrolyte in both rheostats is raised uniformly and at the same rate. By special arrangement of the control, the movement of the electrolyte valves in two cabs can be so related that an equal division of load on all four motors of one locomotive is assured.

One of the features of the previous Norfolk & Western locomotives was an arrangement of the control whereby, in the event of one of the trucks of a locomotive losing its adhesion, full torque could be maintained on the three trucks holding the rail while the torque on the fourth truck was reduced until slipping has stopped when the torque of this truck was raised to a value equal to the others and the acceleration continued. By means of four push buttons located close to the master controller, the engineman can lower the torque on any motor of the locomotive, and on releasing the push button, the torque of this motor will be raised to that of the others automatically.

Pneumatically operated cam type switches are used for the arrangement of the traction motor circuits for either the 14 m. p. hr. connection, or the 28 m. p. hr. connection. The control is so arranged that during transition from one speed to the other the torque of only one-half the locomotive is momentarily lost while making the change in motor connections. This follows exactly the arrangement now existing on the Norfolk and Western locomotives.

A motor driven air compressor is provided on each cab (two per locomotive) having a displacement of 150 cubic feet of free air per minute against a pressure of 130 pounds per square inch. This motor driven compressor set is designed for continuous operation and has sufficient capacity to charge the long trains commonly operated by the railway company. The reservoir capacity per locomotive will be approximately 125,000 cubic inches as an extra safe-guard to insure complete charging of long train lines.

The service to be performed by these locomotives is the most severe to which any electric locomotive has ever been subjected. The traffic consists of heavy tonnage coal trains of 4,000 tons hauled up six miles of 2 per cent grade, on a road noted for its curves. The speed of the train up this heavy grade with two locomotives is 14 m. p. hr. Acceleration of these trains on the 2 per cent grade standing on heavy "S" curves is part of the normal operation.

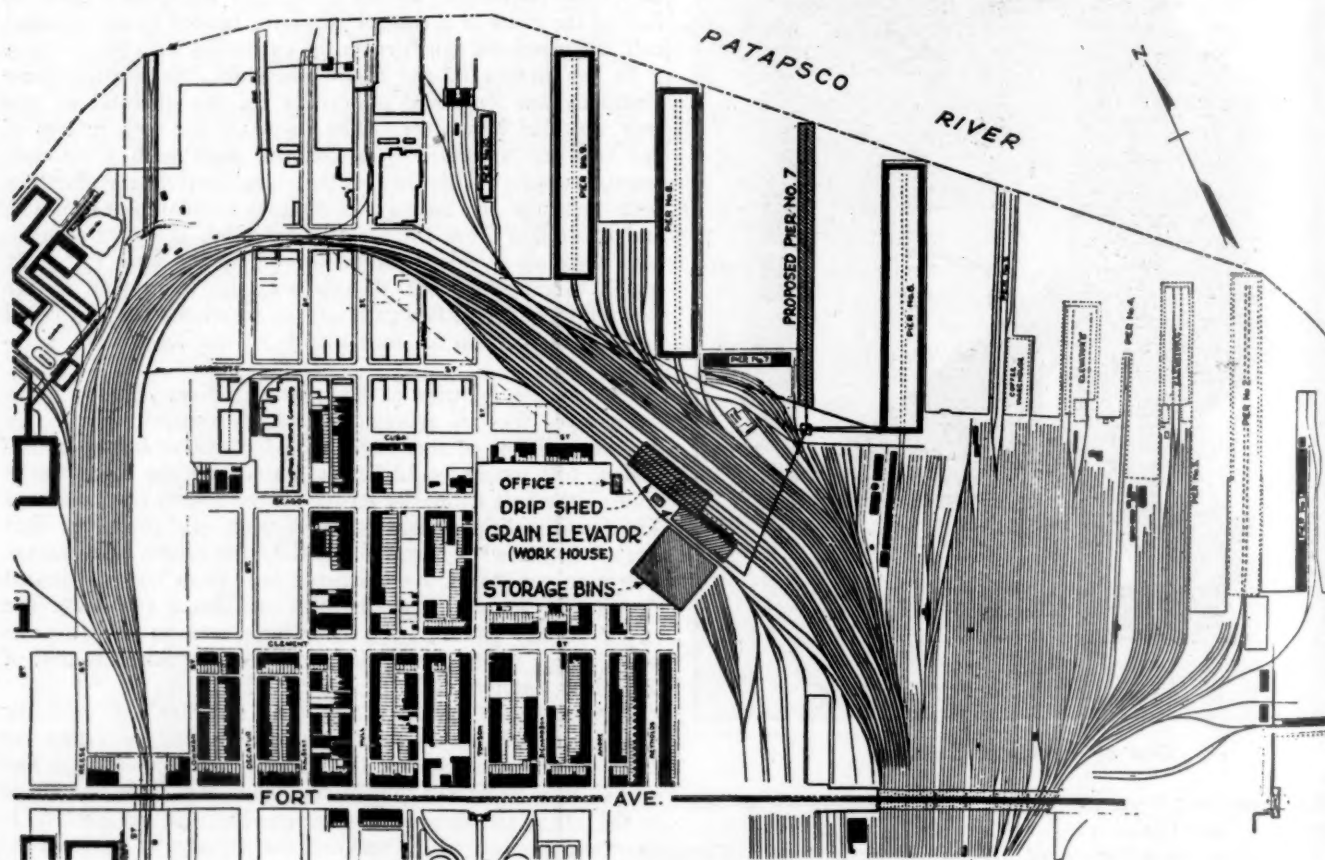
## Baltimore & Ohio Starts New Grain Elevator

**T**HE BALTIMORE AND OHIO has started at its Locust Point terminals, Baltimore, Md., the construction of a new grain elevator, with total capacity of 3,800,000 bu., the storage tanks holding 3,000,000 bu. and the workhouse bins 800,000 bu. The shipping capacity will be 150,000 bu. an hr. to six berths alongside present and proposed piers. In addition to the initial storage capacity, provision is made for the construction of more storage tanks for 6,000,000 bu., which will insure a future capacity of 9,000,000 bu., independent of the workhouse.

The new elevator will be of the most modern type, both as to construction and equipment, and fireproof throughout, costing approximately \$5,500,000 including pier improvements and yard changes. It is designed to be the most rapid

dumpers, arranged to tilt the cars and discharge their contents at the rate of 8 cars an hr. by each machine, or a total of 32 cars an hr. This means a possible dumping of 256 cars for an 8-hr. day or 320 for a 10-hr. day. These dumpers will be housed in the unloading shed over the four unloading tracks, referred to above, on the north side of the workhouse. In addition to the four tracks with dumpers, a power shovel track is provided to unload cars which cannot be handled by dumpers. An extension of the unloading shed, 176 ft. in length, will be used as a drip shed for the prompt handling of cars in bad weather.

Grain discharged from cars by each car dumper unit passes by pits under each track to belt conveyors located in tunnels under ground, by which it is delivered to the elevating legs in the workhouse. The workhouse, where the principal handling of grain will be done, will be a reinforced concrete structure, 61 ft. wide by 240 ft. long and 206 ft. high above the track level. Bins in the workhouse, as already stated, will have a capacity of 800,000 bu. To elevate



Proposed Grain Elevator and Yard at Locust Point

grain handling elevator in the world—a car of grain being unloaded and placed in storage in six minutes. These new facilities will replace the two former grain elevators, B and C, destroyed by fire July 2, 1922, caused by a thunderbolt.

The elevator proper, built throughout of concrete, will stand approximately 500 ft. from the water front. The elevator, workhouse, new yard arrangement and piers are designed and laid out to permit the use of a loop track system by which the loaded cars coming from the receiving yard, with space for 320 cars, will be delivered at the west end of the plant, and the empty cars taken away by gravity at the east end to the "empty" yard, with space for 105 cars. The four unloading tracks will have a capacity of 80 loaded cars. This general arrangement of tracks will permit continuous operation in unloading equipment without interruption and does away with the necessity of switching.

Grain received in cars will be unloaded by four special car

the grain in the workhouse there will be 20 elevating legs, 11 of which will be used for the major operations of receiving and shipping, having a capacity of 25,000 bu. per hr. each, or a total for the 11 principal legs of 275,000 bu. There will be provided 12 main garnerers, each of 3,000 bu. capacity, and 12 specially built scales, each of 2,500 bu. capacity. In addition, 4 smaller garnerers and scales will be used in connection with the driers. The cleaning equipment will consist of 8 machines, 2 oat clippers and Carter disc separators, all of latest type, having capacity of 70,000 bu. per hr. Drying facilities will be housed in a concrete structure immediately in front of the workhouse to the north and over the track shed, and equipped with 8 drier units of the Hess type, of 500 bu. capacity each per hr., making a total hourly drying capacity of from 4,000 to 6,000 bu. Garner capacity of driers will be 48,000 bu.

The grain storage annex will consist of 182 cylindrical

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tanks or bins, 16 ft. in diameter and 96 ft. in depth, also of interspace bins. For the delivery of grain into the storage bins, there will be provided in a cupola story over the tanks, ten 48-in. belt conveyors, and for the withdrawal of grain from tanks for shipping and other purposes, there will be provided in the basement, seven 42-in. belt conveyors. To insure adequate pier facilities for this plant, a new pier 1,000 ft. long by 50 ft. wide, will be constructed as an open pier, to be known as pier No. 7. This new pier will be equipped with grain handling galleries and used exclusively for loading grain into vessels. In addition to this new grain pier, galleries will also be erected above the housing on existing pier No. 6.

For the delivery of grain from the elevator to vessels alongside piers there will be a gallery system leading from shipping bins in workhouse to the waterfront. This gallery system will contain six 42-in. belt conveyors, each with a capacity of 25,000 bu. per hr. These conveyors will be connected with the gallery system, consisting of four conveyor belts on the new pier No. 7, and two on each side of pier No. 6. This general arrangement will provide berthing space for 8 ships, 4 at pier No. 7 for grain only and 4 at pier No. 6 for grain, or for combined grain and general cargo.

An office building, welfare building, dust house, screening house, machine shop and grain door reclaiming plant will be provided in the general equipment, which will also include the latest signal, tel-autograph and phone installations, two passenger elevators, sliding poles for quick movement of workmen, spiral fire escapes, toilet facilities and complete laboratory equipment for grain testing. All of the machinery in the plant will be electrically operated by a total of 130 motor units, aggregating a total of 6530 h. p. in capacity and varying in size from 5 to 175 h. p. per unit.

The plans and specifications for the elevator plant were prepared by the John S. Metcalf Company, Chicago, under the general direction of the engineering department of the Baltimore & Ohio, H. A. Lane, chief engineer, L. P. Kimball, engineer of buildings, and C. E. Wood, general foreman of the company's Locust Point plant at the time the old elevators were destroyed. L. A. Stinson, Chicago, has also been acting with the Baltimore & Ohio as consulting engineer. Detailed working drawings for the main elevator and galleries have been submitted to construction engineers for bids, while some of the preliminary construction work incident to the main program has already been started.

## Refutes Capper's Statements

IN AN OPEN LETTER to Senator Arthur Capper of Kansas, W. W. Baldwin, vice-president of the Chicago, Burlington & Quincy, contradicts statements made by the senator on the floor of the Senate and in the columns of his weekly publication. Mr. Baldwin addressed his communication to Senator Capper following Mr. Capper's announcement on April 6, at Washington, that the farmers and their friends in the House and Senate will not be satisfied until freight rates are reduced on farm products and in view of the senator's comment that his recent speech in the Senate on the necessity of reducing freight rates had been receiving unusual attention from the railroad presidents, particularly Hale Holden, president of the Chicago, Burlington & Quincy.

The letter in part is as follows:

In your speech in the Senate you asserted that the present railroad freight rates place an embargo on the free movement of agricultural products in this country. Is that true? The movement of all commodities by rail during the past year and under the existing freight rates is almost unprecedented; it has been called phenomenal. That could not be if there was

any restriction, much less an embargo upon their movement. Why should you not frankly withdraw your assertion that the present freight rates place an embargo upon the free movement of farm products?

The second assertion in your Senate speech was that thousands upon thousands of crops have rotted because of railroad freight rates. Why do you not produce proof in support of your assertion? I call your attention to the conclusion of your own Joint Committee of Agricultural Inquiry, of the Senate and House, that out of 2,022 cars of barreled apples hauled in 1921, an average distance of 400 miles, the farmer received an average of 80 cents out of every dollar of their wholesale market price, while the freight charges, including refrigeration, heater service, demurrage, diversion, sorting and tally charges, amounted to 11.65 cents. Your commission also reported that on northern potatoes, with an average haul of 400 miles, the farmer received 77.56 cents, while the cost of transportation, including all the other charges, amounted to 19.5 cents.

In the same issue of Capper's Weekly, under a heading "The Tragedy of Transportation" you recite a condition in central New York that explains the farmers' difficulty there as well as in Idaho. The writer says:

"In central New York I saw thousands of bushels of fruit rotting in orchards and being devoured by hogs while the great New York state barge canal that cost \$200,000,000 runs directly through this territory. -On Broadway in New York city, fruit stands were selling apples and pears which came from the orchards on the Pacific Coast, 3,000 miles from Broadway, at from five cents to 25 cents each."

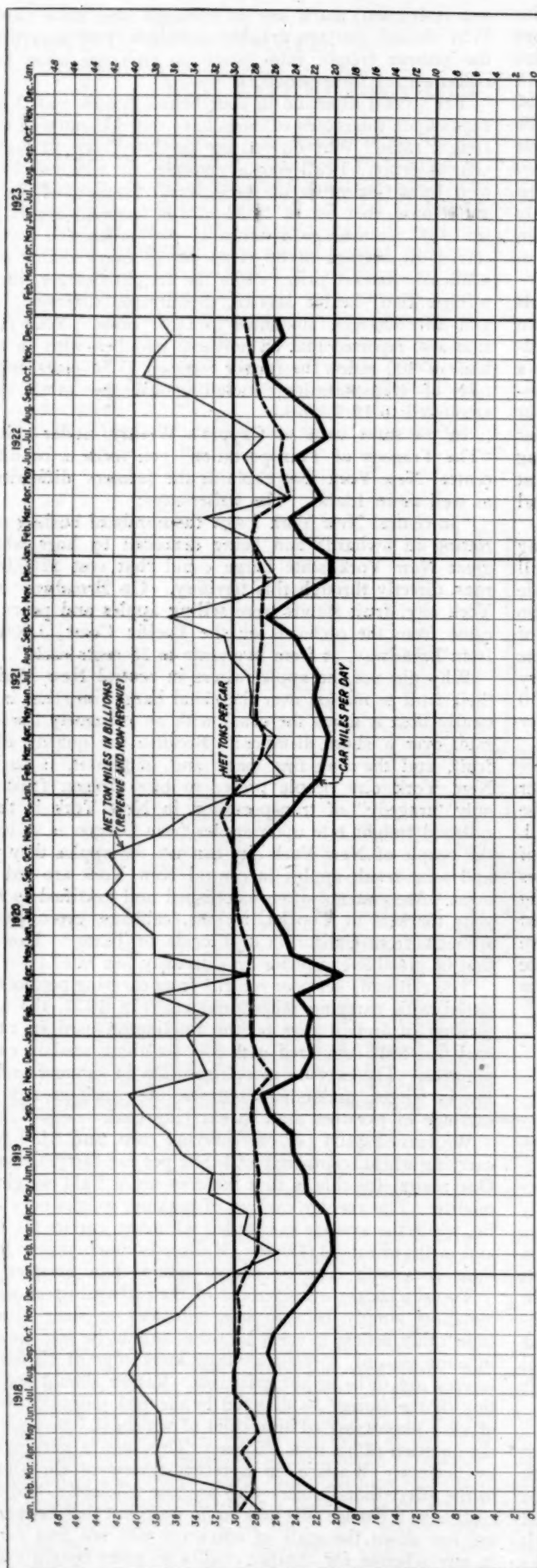
Why did not the apple raisers in central New York send their fruit to market over the canal barge line, that is, practically float it down the canal with an extremely low freight rate, over a short distance? Because the quality of their fruit, and the way they pack and handle it, is such that New York city people prefer to buy Oregon fruit. The only "tragedy" of transportation in New York is that the railroad freight rate upon apples from Oregon is so low that the people of New York city can get the apples they prefer, and as a result apples in central New York are fed to the hogs. Are you not often astonished and gratified to find in your markets at Topeka, melons, cabbage, green peas and spinach, from California or Florida or Texas? How could that be possible except for an extremely low rate?

The railroads get poor returns from carrying potatoes, compared with carrying other products. In 1922, the average earning of freight cars on the Burlington used in carrying coal was \$91, compared with \$81 for those used in carrying potatoes. The expense of refrigeration in summer and heating in winter, and other expenses, are much greater in the carriage of potatoes than in carrying coal.

We earned \$104 per car carrying corn, and \$139 per car carrying wheat, compared with \$81 per car carrying potatoes. One reason for this is that potatoes are a light weight commodity. The average carload of potatoes weighs only 36,000 lb., while the average car loaded with corn carries 80,000 lb., and with wheat 82,000 lb. Railroads much prefer loading their cars with corn or wheat, rather than potatoes.

To criticize the management of the railroad upon scattered instances simply because some potatoes or some apples or some other article in some localities cannot be sold profitably in some seasons, without accurate knowledge of all the facts, is very apt to be unjust criticism. Rather should the attention of the farmer be directed to the real questions that are of vital importance to him, chief of which, if I may say so, is the question of his own efficiency. This idea is well expressed by Secretary Wallace, in a recent review of the situation, to the effect that farmers who produce efficiently, and at low cost, have a chance this year to do well, but that farmers who are low down the scale of efficiency will not find salvation in any schemes for cheaper credits or lower freight rates.

## 30 Tons per Car—30 Miles per Car per Day



### Two Objectives of the A. R. A. Transportation Program for 1923

The A. R. A. program for increasing the efficiency of railway transportation to handle properly the prospective heavy business of 1923 has eight objectives. The seventh and eighth of these deal with tons per car and car miles per day and read as follows:

"7. That all interested be impressed with the necessity for loading all cars to maximum capacity in an effort to bring the average loading to 30 tons per car for the entire country; for unloading cars promptly; increasing storage facilities where necessary and providing adequate siding capacity to facilitate loading and unloading, thereby increasing the number of available cars.

"8. That every possible means be adopted to increase the mileage per car per day to an average of 30 for the entire country, particular attention being given to prompt movement through terminals

and yards and to the issuance of embargoes when necessary to prevent congestion.

"Co-operation of shippers and the public in the past has been most helpful in bringing about heavier loading, prompt unloading and increased mileage per car, and only by their continued co-operation and their full knowledge of what this means to their own transportation requirements can results be secured in these matters. It will be understood that each individual railroad will co-operate with its own shippers to this end and the Car Service Division will take similar action with national and district associations to bring about the fullest measure of co-operative effort."

The chart shows the average monthly performance for the five-year period 1918 to 1922 inclusive and also for January, 1923, the figures for which are the latest at present available. To present a clearer

picture there has been plotted the curve of net ton-miles. It will be noted that the curve of car miles per day varies in close relationship with that of net ton-miles, whereas the curve of net tons per car does not. The average performance of 30 tons per car has been secured on previous occasions, notably in 1918, when the demands of war impelled railroads and shippers alike to secure the best possible utilization of car capacity and again in the fall of 1920, when there was conducted a campaign for railway transportation efficiency similar to that announced for 1923. The average net tons per car throughout most of 1922 were below the average of previous years, the reason being the absence of coal tonnage. At no time, however, in the five-year period—even when there were peak loads of traffic—has the car miles per day reached the desired 30.



# Thermal Stresses in Steel Car Wheels

## Results of Investigation by the Bureau of Standards to Determine Effect of Heating Due to Brake Applications

By George K. Burgess and G. Willard Quick

NINETEEN steel wheels have been tested in the laboratory of the Bureau of Standards under conditions approximating those encountered in service caused by heavy brake applications. The rims of the wheels were heated to a temperature of 380 deg. C. (716 deg. F.) by passing an electric current through a band of soft steel encircling the wheel. The resulting stresses were calculated from strain-gage measurements after correcting for thermal

perienced railway men stated that the tread becomes heated to a dull red on long, heavy grades by the application of brake shoes. It was agreed that it would be of general interest and of value to investigate the stresses thus set up, the plan being to conduct the tests in a manner identical with the procedure followed in a previous investigation of the thermal stresses in chilled iron car wheels with some additional tests on steel wheels at as high a temperature as pos-



Fig. 1—Car Wheel in Test Stand Ready for Bureau of Standards Thermal Test

expansion. Eight worn wheels and eleven new wheels representing five types of manufacture were tested and none failed in the tests. As a result of heating the rim, the hub moved with respect to the rim, inducing tensile stress on the face and compression on the back near the hub. Near the rim the stresses were in compression on the face and in tension on the back except for worn wheels where no stress was induced on the face. The maximum surface stresses developed were slightly above the yield point of the material, producing a permanent set for the first tests on new wheels while no set resulted from tests on old wheels or in succeeding tests on new wheels.

This investigation was the result of a conference of representatives of several manufacturers and purchasers of steel car wheels held at the Bureau of Standards in 1920. Ex-

sible with the special equipment and including a survey of the stresses induced in the back of the plate.

Other problems present themselves in connection with the subject of stress caused by brake application; as the effect of speed, shoe pressure and length of application in producing thermal stresses. At Purdue University an investigation of these problems, with the wheels revolving while a brake shoe is held in contact with the tread, is in progress. In the investigation at the Bureau of Standards the manner in which thermal stresses build up in wheels, the magnitude, nature and location of stresses have been studied.

### Wheels Tested and Method of Manufacture

The wheels were 33-in. steel car wheels representing the product of six different plants and five methods of manu-

facture. Two new wheels furnished by each of four different manufacturers, one new wheel and two special wheels—one with a thin web and one with a straight web—from another mill, together with eight worn wheels furnished by the Pennsylvania Railroad representing the product of four different plants, made a total of 19 wheels upon which one or more series of measurements were made. The manufacturers co-operating have been designated by the letters U, V, W, X, Y, and Z. Table I gives a brief description of the method of manufacture. Fig. 2, Fig. 3, and Fig 4 show sections of the various standard wheels.

TABLE I—WHEELS TESTED

Mfrs.	Method of Manufacture.
U	Forged and rolled from an individual ingot.
V	22 in. by 22 in. ingot rolled into 15 in. round which is sheared into blanks. The blanks are forged and rolled into wheels.
W	Ingot rolled into plates from which biscuits are cut. These biscuits are forged and rolled into wheels.
X	Cast in a revolving mold. First part of pour is high in manganese, forming the tread, while low carbon steel forms plate and hub.
Y	Same procedure as manufacturer V.
Z	90 in., 12 sided, fluted ingot with sand lined sink head is cut cold into blocks of proper weight. These blocks are heated in a continuous furnace after which they are forged and rolled into wheels.

†One standard design, one thin plate, one straight plate.

### Procedure for Thermal Stress Tests

In the thermal stress tests the wheel was mounted on a hollow water-cooled 6-in. axle. The axle in turn rested upon supports. A soft-steel resistor  $3\frac{1}{2}$  in. in width and  $\frac{1}{4}$  in. in thickness was placed on the tread of the wheel, but insulated from it by a thin sheet of perforated asbestos, and an alternating current of 1,000 to 1,500 amperes at 15 to 30 volts was passed through it. Undue radiation of heat into the air was prevented by the use of asbestos covering. Fig. 1 shows the arrangement of this apparatus.

The tread of the wheel attained a maximum temperature of approximately 380 deg. C. (716 deg. F.) in each run. To determine the distribution of temperature in the wheel from tread to hub copper-constantan thermocouples of No.

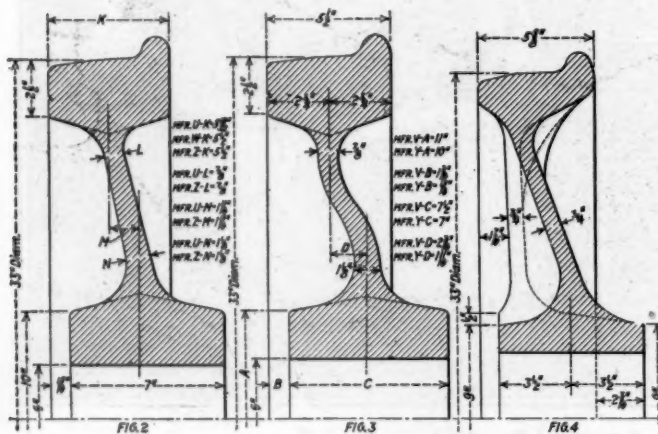


Fig. 2—Sections of Forged Wheels of Manufacturers, U, W and Z

Fig. 3—Sections of Forged Wheels of Manufacturers V and Y  
Fig. 4—Section of Cast Steel Wheels of Manufacturer X

30 B. & S. gage wire were used—seven couples along a vertical radius at approximately 2-in. intervals and seven others similarly located along the horizontal radius. Readings were taken along both radii for the purpose of obtaining duplicate results. Two other thermocouples were inserted into the tread of the wheel. Thus, four couples, one at the gap in the resistor, were placed at equidistant points in the tread of the wheel and assurance given that uniformity of tread temperatures was attained. The 16 copper-constantan thermocouples can be seen in Fig. 1, extending from the

wheel to overhead supports and then down to the potentiometer on the transformer table.

A 2-in. Berry strain gage was used for measuring the deformations. Five or six sets of readings were taken at 1-in. intervals on the vertical and horizontal radii on both the face and back of the plate.

It was only necessary to survey the stresses along the radii of the wheels, since preliminary measurements had shown that the tangential stresses were of a compressive nature and of relatively small magnitude.

Identical rates of power input were maintained for each test in order to obtain comparative results. It was necessary to increase the power input near the end of the test to attain the desired tread temperature in a comparatively short

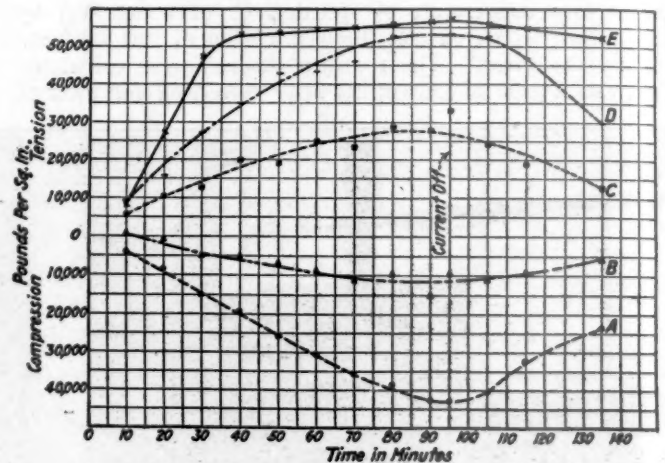


Fig. 5—Stress-Time Curves Showing Average Stresses Developed on Face of All Wheels of Manufacturer Y

time. The amount of power applied per minute during the different periods of the test was as follows:

First half hour.....	570,000 ft. lb.
Second half hour.....	690,000 ft. lb.
Third half hour.....	770,000 ft. lb.
Fourth half hour.....	797,000 ft. lb.

In these tests the resistor completely encircled the wheel and was thermally insulated. Under these conditions a larger percentage of the energy entered the wheel than would have been the case had the same wheel been subjected to brake application in service, due to the fact that part of the energy destroyed by friction between the shoe and wheel goes to heating the brake shoe, and thence by radiation to the air, and further, the shoe only bears on a small part of the circumference, thus allowing the heat in the uncovered part of the tread to radiate instead of entering the wheel.

Readings were taken of the temperature, strain, and power input at regular intervals, a strain gage reading of the cold wheel being also taken before the test was started. When the desired tread temperature was reached, the power was shut off and the asbestos covering on the resistor removed to permit more rapid dissipation of the heat. Temperature and strain gage readings were also taken during cooling and after the wheel was at room temperature.

The elongation as determined by the strain gage is attributable to two causes: (1) An elongation due to the thermal expansion of metal, and (2) elongation caused by the strain due to the temperature gradient from tread to hub of the wheel. By knowing the coefficient of expansion and the temperature rise it was possible to calculate the thermal expansion. By deducting the elongation due to this expansion from the total elongation, the elongation due to stress alone was determined. The relation between stress and strain on samples actually taken from the wheels made it possible to convert the strain readings into stress values.

For the new rolled steel wheels of regular design the maxi-



imum stresses developed on the face of the plate were in tension near the hub and in compression near the rim, while on the back of the plate the conditions were reversed. These stresses are produced by expansion of the rim causing the hub to move relative to the rim. The average movement of the hubs of the standard design wheels ranged from .07 in. to .10 in. Fig. 5 shows typical time-stress curves for the face and Fig. 6 for the back of the plate of new steel wheels. The readings from which these curves were plotted were taken at points 1 in. apart, radially, on the plate of the wheel, A being toward the rim and E toward the hub.

Of the two special wheels furnished by manufacturer Z the one with a thinner plate developed stresses similar to but of somewhat greater magnitude than those developed in the wheels of regular design. The tread of this wheel was also lighter than that of the regular wheels. The stresses developed in the special wheel with the straight plate were in tension on both the face and the back of the plate.

For the worn wheels tested, in which considerable metal had been worn from the tread, the stresses developed on the face of the plate were in tension near the hub and gradually diminished to practically zero at the rim, while on the back of the plate the stresses were of about the same nature and magnitude as for the new wheels. The neutral axis on the

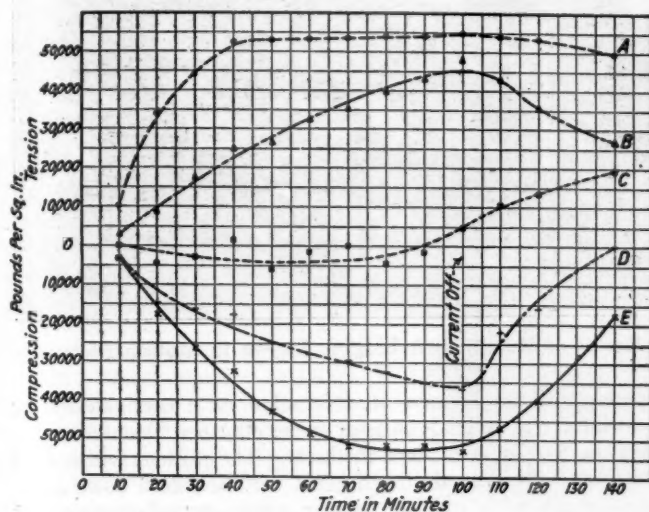


Fig. 6—Stress-Time Curves Showing Average Stresses Developed on Back of All New Wheels of Manufacturer Y

face of the old wheels is shifted out towards the rim. This difference for worn wheels may be due to the work on the tread, static loads, impacts, the thinner tread or a combination of these factors.

In the tests on the cast steel wheels, the stresses were more complicated because of the nature of the plate, which is of a corrugated design.

From the first test on new wheels, a permanent set was observed on the surfaces of the plates, at positions of maximum stress, indicating that the material was strained beyond the yield point at the points on the surface. The greatest compressive stress observed was 68,800 lb. per sq. in. and the greatest tensile stress 58,100 lb. per sq. in.

In succeeding tests on new rolled steel wheels of standard section and in all tests on old wheels there were no permanent deformations noted, showing that the stress is not increased beyond the yield point on repeated heating. The tests on the old wheels indicate that the heating they had been subjected to in service stressed them beyond the yield point on the surface of the plates at certain positions, and relieved any manufacturing strains, rendering these wheels in the same condition as new wheels after the first thermal test in this investigation.

The maximum tread temperature ordinarily reached about 380 deg. C. (716 deg. F.) in 90 minutes. Special tests were made on two new rolled wheels and one new cast wheel at the highest temperature attainable with the equipment, about 500 deg. C. (932 deg. F.). The time to reach this temperature was about 60 minutes longer than was required to reach 380 deg. C. in the regular tests but the stresses developed were no greater. The greater strain in the plate appears to be offset by greater expansion due to the higher temperature, thus giving a flat, stress-time curve between 380 deg. C. and 500 deg. C.

### Summary and Conclusions

Nineteen 33-in. steel wheels have been tested in a manner approximating conditions encountered in service through long applications of brakes on heavy grades. In the tests the rims of the wheels were heated electrically and the hubs were kept cool by passing water through the hollow axle upon which the wheels were mounted. The maximum tread temperature was 380 deg. C. (716 deg. F.) in the regular tests and in the special tests a maximum temperature of 500 deg. C. (932 deg. F.) was attained. From observations of the deformations in the plates of the wheels the stresses have been computed after correcting for temperature. Six manufacturers furnished new wheels representing five different methods of manufacture. Eight old wheels manufactured by four of the companies were also tested. The general results of the tests may be summarized as follows:

1. None of the wheels failed.
  2. When the rim is heated the hub moves with respect to the rim, inducing stresses in the plate which, for the first test on new wheels, are in tension near the hub and in compression near the rim on the face, while on the back of the plate the stresses for the same positions near hub and rim are about equal in magnitude but reverse in nature to those on the face.
  3. For worn wheels, the stresses are of the same character, except near the rim on the face where very little stress is found. This difference is due to the shifting of the neutral axis on the face from the center of the radius towards the rim and is caused by conditions of service.
  4. The maximum stresses were slightly above the yield point of the material as determined in tensile tests.
  5. A permanent set was apparent only for new wheels on the first tests. For old wheels and in succeeding tests on new wheels, there was no set apparent, showing that the stresses above the yield point were not increased by repeated heating, and that the old wheels had been rendered, by service, in a condition similar to that of new wheels after the first thermal test.
  6. For forged wheels the character and magnitude of the stresses developed in the surface of the plate are little affected by the method of manufacture. The stresses developed in the cast-steel wheels were, because of the corrugated plate, more complicated than those in the forged wheels.
- The Bureau of Standards is undertaking a study of the residual stresses in steel car wheels from the manufacturing processes. In this work sections are being sawed from the wheels and stresses so relieved will be calculated from deformations measured with a strain-gage.

GRACE WHITE, of Fairfield, Ill., Opal Speck, of Pleasant Plains, Ill., and John Shutt, of Garrett, Ind., spent their Easter vacations at the National capital as guests of the Baltimore & Ohio Railroad. These persons are beneficiaries of educational work done by the railroad company among farmers, and a visit to Washington is classed as a "scholarship." Prizes were offered to the members of boy and girl clubs on the farms; and Miss White won her scholarship by raising a fine flock of White Rock chickens; Miss Speck put up 234 jars of fruit, vegetables, etc., and Mr. Shutt raised potatoes at the rate of 228 bushels to the acre.

## Motion Pictures Save Money for the Illinois Central

**A**MONG THE MEASURES which the Illinois Central employed in its campaign to reduce loss and damage claims over \$1,200,000 in 1922, was the extensive use of motion pictures to educate those of its employees engaged in handling freight and switching cars in safe and efficient ways of performing their work. These films were only one phase of the general program of this company to make the fullest use of visual education in instructing its employees. Under the direction of J. K. Melton, official photographer, nine reels have been produced dealing with freight handling, fuel economy and agricultural development.

The moving pictures were introduced because it was believed that many employees fail to observe the instructions set forth in bulletins and circulars and that visual education would prove a more effective means of instruction. With the thought of increasing labor efficiency and preventing excessive waste, the films have been rushed to completion and circulated over the entire system.

Films for the switchmen and freight handlers have been found most effective when displayed in the freight houses by means of a portable projector, the men being taken from their work to view them. It was thought that the lessons would make a deeper and more permanent impression when thus driven home to each individual in his working environment. Special meetings were also held for station agents assembled at central points from a number of nearby stations. A special exhibiting car has also been provided for a traveling exhibitor which is kept constantly in use.

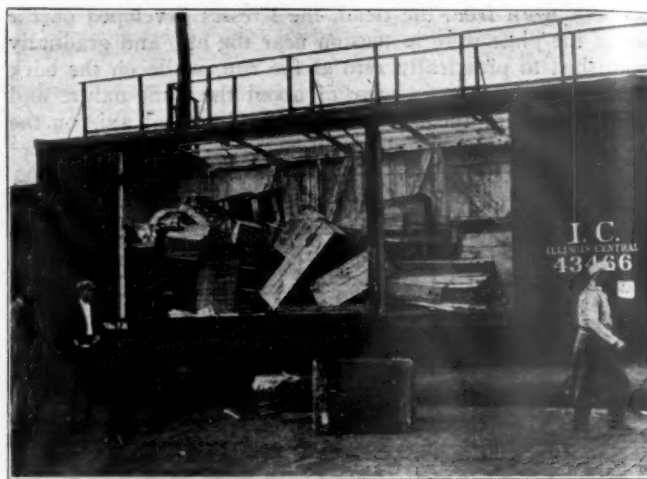
The films on freight claim prevention were planned to show the normal operations of freight handlers in a day's work, dealing directly with the causes and effects of damage, large or small, to freight. They were designed to show freight handlers the costly results of some of their practices in a way which written instructions could not equal on account of the type of workmen employed. The proper methods of stowing freight of various kinds are set forth and the dangers in the careless use of the freight hook are also pictured. It is brought home convincingly to the workmen that the direct damage to even a small article may result in much greater damage to the remainder of the shipment. The results of leaking liquids with consequent damage to labels and cans are shown by photographs of ordinary boxes of canned goods which had been damaged in this manner.

Other films show the results of accidents by the improper use of trucks and other freight handling machinery. Necessity for care in the handling of perishable goods such as fruit and vegetables is also emphasized by photographs of such commodities which have been loaded carelessly and allowed to spoil. The freight employees are taught, furthermore, how to avoid such losses and how to repair much damage before the shipments are delivered in order to eliminate exceptions and reduce losses. Graphs and pictures displayed on the screen show realistically how a little damage at St. Louis, plus a little more at Louisville and Nashville, mounts up in the course of a year until the bill reaches staggering proportions. During the past summer the loss and damage films assisted materially in the success of the "no exception" drive in which each division vied with the others to beat all previous records.

Switchmen are taught how destructive their methods often are to the ordinary shipment of goods. By the use of the film the damage from impact shocks is visualized for their benefit in a graphic manner. A special car loaded with ordinary package freight from which one side had been cut away was used, with a wire netting in place of the side of the car to keep the freight in the car. Impacts resulting from collisions

with a switch engine at from 1 to 20 miles an hour are shown with this car, and the destructive results of all but the most careful switching is thus brought home to the switchmen. The pictures show that collisions at a speed of 12 miles an hour or over result in the nearly total destruction of ordinary freight. An impact register, which registers jars from impact, was also placed in the car, this register being divided into four zones: safe, rough, violent and destructive. A needle on a moving sheet of paper indicates the exact force of each impact in coupling and a close-up of this register is shown on the screen after each collision test is pictured, followed by a close-up of the contents of the freight car. It is thus made plain to the most skeptical switchmen that couplings made at high rates of speed destroy nearly everything within the cars.

Films on poultry raising, fruit raising and better farming are used extensively by the traffic department. Through co-operation with the Agricultural and Mining College of



Result of Rough Switching as Shown in Motion Pictures

Mississippi, the farmers in that state have been shown by the film the actual advantages to be obtained through cross-breeding and other modern methods. The present widespread practice of crossing northern bulls with southern cows is the direct result of a moving picture campaign advocating this method. These films are shown to the farmers in a special exhibiting car as well as in theaters and stations at towns along the line.

Proper methods of handling coal and means of preventing fuel waste are shown in a film illustrating the efficient way to fire a locomotive. This is a practical film, picturing the right and wrong methods and demonstrating to the engine crew that the most efficient and economical locomotive firing is also the easiest. It also shows that machinists and car inspectors, through inefficient work and carelessness, may cause the waste of a large volume of coal. The value of coal in modern life and the necessity for thrift in its use are set forth in an unusual manner by a picture outlining the history of coal from the beginning of its formation to the time of its use.

Another interesting film which has been made shows the various types of engineering on the system. This illustrates masonry and steel construction, and the methods of placing them and also shows the operation of pile drivers and ditchers. This film does not attempt to teach proper engineering methods but is of interest on account of the practical way in which it illustrates the work of the engineering department.

In exhibiting the reels it was found best to mix films of several types in order to maintain full and interested attention. Thus, a reel on freight handling will be shown with the one on fuel economy to both freight handlers and engineers so that each can learn the problems of the other department and profit thereby.



## Stuyvesant Fish

**S**TUYVESANT FISH, of New York, from 1887 to 1907 president of the Illinois Central and prominent in railroad financial affairs up to the day of his death, died suddenly of heart disease in New York on April 10, at the age of 72. Mr. Fish was born in New York City and had lived there all his life. He was a clerk in the New York office of the Illinois Central and later served as secretary to the president. About 1876 he was elected a director of the company and took a prominent part in the operations leading to the acquisition of the lines south of the Ohio River, which now form that part of the Illinois Central System. He was chosen second vice-president in 1883, first vice-president in 1884, and president in 1887. His retirement after 20 years of successful management was due to the acquisition of control of the stock of the road by E. H. Harriman, which change was accompanied by acrimonious strife extending through several years. He was afterward interested in other railroads and was a director in the Missouri, Kansas & Texas at the time of his death.

Many railroad men will remember Mr. Fish principally through his connection with the American Railway Association of which he was president in 1905. The year in which that association entertained the delegates to the International Railway Congress on the occasion of the meeting of that Congress at Washington. Since then Mr. Fish has been a member of the International Railway Association. The visit of the European delegates to America in 1905 was the only occasion on which the American Railway Association ever exercised a notable social function, and Mr. Fish was perhaps its only president who combined the requisite personal qualities, that is, he was a railroad officer a millionaire, and a leader (with his wife) in social life. And, as was observed by a biographer who knew him, he had more than wealth, lineage and brains; he had character.

THE CITY OF LOS ANGELES has sent a petition to the Interstate Commerce Commission asking that the railroads be required to build a union passenger station there and to eliminate numerous grade crossings, described as dangerous. The complaint is directed against the Santa Fe, the Union Pacific, the Southern Pacific, the Los Angeles & Salt Lake and the Pacific Electric.

THE PEOPLE ARE THE OWNERS OF THE RAILROADS. This fact was brought out in an address by Haley Fiske, president of the Metropolitan Life Insurance Company, before representatives and guests of that company at a dinner on April 6 at Chicago. Mr. Fiske urged a campaign of education which would convey this knowledge to the policyholders of the company, declaring that when the policyholders realize that the Metropolitan has \$226,000,000 invested in the securities of the railroads these properties will cease to be the football of politicians.

## Hearing on New York Port Conditions

**C.** B. AITCHISON, representing the Interstate Commerce Commission, began a hearing in New York City on April 5 on the question whether or not the commission can co-operate with or aid the Port of New York Authority in its proposed unification and improvement of the railroad terminal tracks and other facilities in and around New York harbor. Sitting with Commissioner Aitchison were Commissioners Potter and Cox; and the Port Authority was represented by Chairman E. H. Outerbridge, J. S. Smith, D. Van Buskirk and Lewis H. Pounds. About 200 representatives of cities, boards of trade, etc., were present.

The hearing was held at the office of the Port Authority and was called a concurrent hearing, the local body and the commission acting together; but the first speaker representing the railroads, R. J. Cary, general counsel of the New York Central, presented an elaborate argument to the effect that the Port Authority lacked the power to require the attendance of the railroads. Mr. Cary declared that the roads were answerable only to the Interstate Commerce Commission, at the same time questioning whether the commission has much authority in connection with what the Port Authority is planning to do; but he said that the railroads were ready and willing to confer with the Port Authority, and to do everything practicable to improve the railroad conditions of the port. He cited the correspondence of the past two years to show that the railroads, individually, had constantly maintained a friendly attitude toward the Port Authority.

In the course of his argument, Mr. Cary explained the waiting attitude of the railroads by showing the incompleteness of the plans which the Port Authority has made; the railroads cannot decide their attitude until they know fully what is expected of them. One of the principal proposals of the Port Authority is the consolidation, for operation, of the short sections of railroad on the west side of the Hudson River, close to the shore, from Weehawken to Bayonne; and the railroads complain that this will involve a surrender of their individual rights, the operation of this line as a single railroad being feasible only by means of a complete consolidation. The spokesman of the Port Authority replied that thus far they had dealt only with the physical properties, and that the question of changing ownership or the detail method of operation, had not yet been considered.

Mr. Cary argued at length for the maintenance of competition, declaring that the best interests of the public require that each railroad terminal shall, in the future as at present, be operated by its owners.

General George W. Goethals, consulting engineer of the Port Authority, replied to the railroad arguments and described some of the defects of present methods of operation.



Stuyvesant Fish

The different roads run freight trains over each other's tracks and there is much friction and lost motion. Freight moving from one New York terminal to another, perhaps four or five miles north or south, is sent 50 to 100 miles west, to some junction between the rival roads, and then brought back again. Emphasis was laid on the fact that important industries on the New Jersey water front, now having the facilities of only one railroad connection, would be greatly benefited by the conversion of the shore line tracks into a single belt line, thus giving the industries the benefit of a short connection to any or all of the railroads.

SIR HENRY DRAYTON, of Ottawa, former chairman of the Railroad Board and late Minister of Finance of Canada, in an address delivered before the Kiwanis Club of Atlantic City, N. J., on April 5 predicted that the Canadian National Railways would eventually cease to be a source of great expense to the Canadian people. He spoke of the serious effect that the "McAdoo wage awards" had had on the operating expenses of the Canadian roads.

## Freight Car Loading

WASHINGTON, D. C.

LOADING OF REVENUE FREIGHT showed another large increase during the week ended March 31 to 938,725 cars, which is not only unprecedented for the period of the year, but is almost the largest loading for a week during the first half of any year. This is an increase of 21,000 cars as compared with the week before, 116,917 cars as compared with the corresponding week of last year and 275,554 cars as compared with 1921. All districts showed increases as compared with both of the preceding years, as did all classes of commodities except coal and l.c.l. merchandise. Miscellaneous freight showed an increase of 75,588 cars as compared with last year and forest products showed an increase of 21,123. Coal loading was 2,853 cars below the corresponding week of last year and l.c.l. merchandise showed a decrease of 5,298 cars.

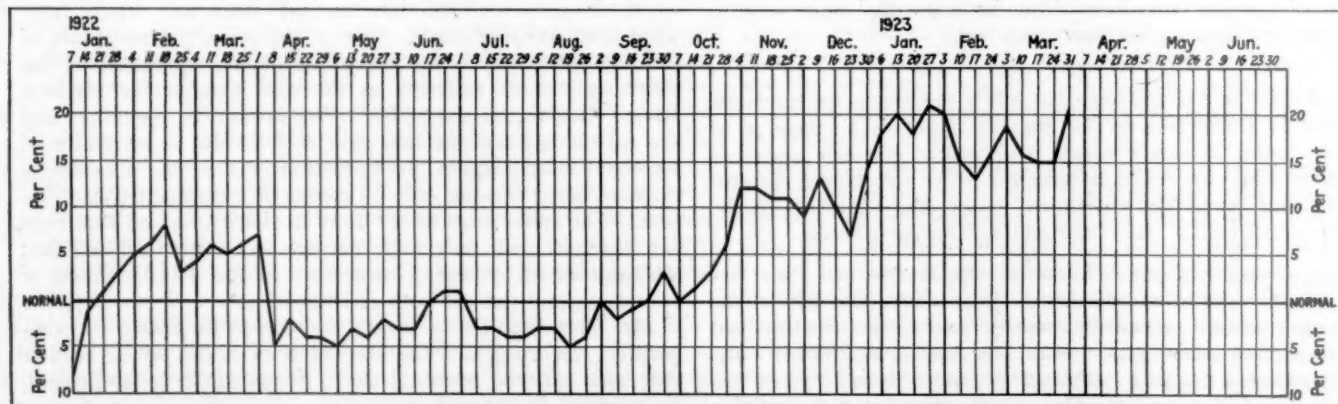
The freight car shortage continues to diminish slowly, the total for the period from March 23 to 31 being 68,986. This included 30,849 box cars and 29,281 coal cars.

### REVENUE FREIGHT LOADED

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, MARCH 31, 1923

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue freight loaded		
										1923	1922	1921
Eastern	1923	8,435	2,902	52,614	4,476	6,547	2,796	62,600	92,868	233,238	.....	.....
	1922	6,614	2,518	50,359	2,229	4,415	1,170	67,353	69,669	.....	204,327	160,599
Allegheny	1923	2,917	2,508	51,255	7,323	3,969	5,549	48,665	84,343	206,529	.....	.....
	1922	2,097	2,492	54,205	4,539	2,589	1,727	50,488	61,529	.....	179,666	129,069
Pocahontas	1923	223	76	23,760	580	1,731	213	6,121	4,821	37,525	.....	.....
	1922	211	69	24,907	241	1,316	30	6,082	4,356	.....	37,212	22,466
Southern	1923	4,425	2,360	23,877	1,356	24,625	1,787	39,625	50,848	148,903	.....	.....
	1922	3,058	2,128	23,117	541	18,211	687	39,066	43,271	.....	130,079	109,958
Northwestern	1923	11,340	9,746	6,865	1,444	20,889	1,258	28,578	33,383	113,503	.....	.....
	1922	8,827	7,050	7,534	1,261	16,562	586	28,358	28,007	.....	98,185	84,484
Central Western	1923	10,498	11,930	19,434	445	9,749	3,193	35,480	50,930	141,659	.....	.....
	1922	10,483	9,764	20,807	241	5,510	1,243	35,195	38,317	.....	121,460	99,827
Southwestern	1923	4,004	2,204	4,863	116	8,614	639	14,626	23,302	57,368	.....	.....
	1922	3,845	1,926	4,592	162	6,398	647	14,451	18,858	.....	50,879	56,768
Totals, West. Dist.	1923	25,842	23,880	31,162	2,005	39,252	5,090	78,684	106,615	312,530	.....	.....
	1922	23,155	18,740	32,933	1,664	28,470	2,476	78,004	85,082	.....	270,524	241,079
Total all roads	1923	41,842	31,726	182,668	15,740	76,124	15,435	235,695	339,495	938,725	.....	.....
	1922	35,135	25,947	185,521	9,214	55,001	6,090	240,993	263,907	.....	821,808	.....
Increase compared...	1921	33,158	23,671	107,170	6,448	45,804	5,304	212,682	228,934	.....	.....	663,171
	1922	6,707	5,779	.....	6,526	21,123	9,345	.....	75,588	116,917	.....	.....
Decrease compared...	1922	.....	.....	2,853	.....	.....	.....	5,298	.....	.....	.....	.....
	1921	8,684	8,055	75,498	9,292	30,320	10,131	23,013	110,561	275,554	.....	.....
Decrease compared...	1921	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
March 31	1923	41,842	31,726	182,668	15,740	76,124	15,435	235,695	339,495	938,725	821,808	663,171
	1923	39,383	30,349	185,062	14,839	73,384	14,700	232,639	326,680	917,036	837,241	686,567
March 24	1923	39,288	30,633	183,530	15,322	74,152	12,786	229,161	319,414	904,286	815,082	691,396
	1923	41,532	31,039	186,327	15,240	75,548	11,818	229,146	314,569	905,219	820,886	700,440
March 17	1923	44,967	32,810	193,551	16,138	76,131	10,547	226,818	316,934	917,896	793,115	711,367
	1923	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Compiled by the Car Service Division, American Railway Association.



Freight Car Loadings Per Cent of Normal—Per Cent for Each Week Figured on Basis of Average for Corresponding Weeks, 1918 to 1922, Inclusive



# Central of Georgia Moves Record Traffic

Net Ton Miles for Each Month from September to January  
in Excess of October, 1920, Peak

A DISTINGUISHING feature of railway operations in 1922 was the relatively more satisfactory earnings position of the lines in the South as compared with that of the lines in other parts of the country. The southern lines had not fared at all well in 1921, as was evidenced by the fact that whereas in that year the railroads of the country as a whole earned 3.33 per cent on their tentative valuation, the roads in the southern district had a net railway operating income equivalent to only 2.67 per cent. In 1922, as compared

ended June 30, 1917, it is proper to consider it as good an average of pre-war earnings as may conveniently be ascertained. In view of the fact that the 1922 net exceeded the standard return figure by nearly a million dollars, it seems reasonable to observe that the Central of Georgia can now be said to have restored its net earnings to a pre-war basis. The corporate net after fixed charges in 1922 is shown as \$2,065,812, contrasting with a deficit in 1921 of \$979,814, or showing an increase over 1921 of no less than \$3,045,626. The 1922 figure of net after charges is the best net return which the Central of Georgia has reported since 1917. In 1917, it had a net after charges of \$2,640,628 and in 1916, of \$2,649,651. It is a reasonable expectation that unless the unforeseen happens, these figures may easily be exceeded in 1923.

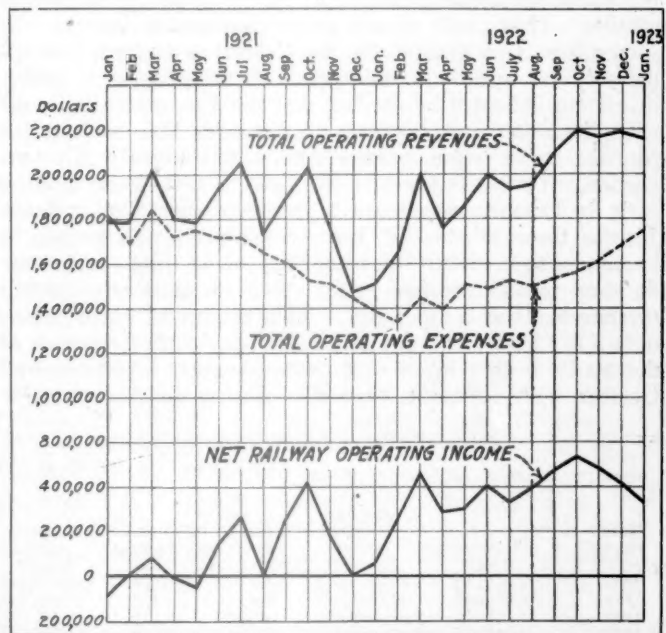
The Central of Georgia is a subsidiary of the Illinois Central and is in reality an extension of that property into the Southeast. The Illinois Central owns all of the common and preferred stock. The common totals \$5,000,000 and pays 5 per cent dividends aggregating \$250,000 annually; it was purchased, incidentally, from E. H. Harriman in June, 1909 for \$3,474,279. The preferred issue totals \$15,000,000; its dividends are 6 per cent cumulative, aggregating \$900,000



The Central of Georgia

with 1921, the roads of the country increased their net railway operating income by 26 per cent. The increase in the eastern district (including the Pocahontas region) was 25.3 per cent; that in the western district was a mere 13.8 per cent, but the increase in the southern district was so good as to amount to no less than 90.8 per cent. This increase was sufficient so that while the roads of the country as a whole earned an equivalent of 4.14 per cent on their tentative valuation, those in the South earned 5.05 per cent. It is true that 5.05 is much below the 5¾ per cent which the Interstate Commerce Commission has determined to be a reasonable return, but the fact remains that the southern roads succeeded in showing a marked recovery from their poor returns in 1920 and 1921 and because of their much improved earnings, were much more in the eye of those who make it their business to study the reports of railroad earnings.

With this situation in mind, the annual statement recently issued by the Central of Georgia may be considered to have a special interest due to the fact that it is the first report covering operations in 1922 to be issued by any of the southern lines. The report is a remarkably good one. It shows a net operating income for the year of \$4,392,084, comparing with \$1,220,655 in 1921 and an increase over that year of \$3,171,429. The property's standard return during federal control was \$3,408,809 and inasmuch as this was based on the average net railway operating income for the three years



Revenues and Expenses

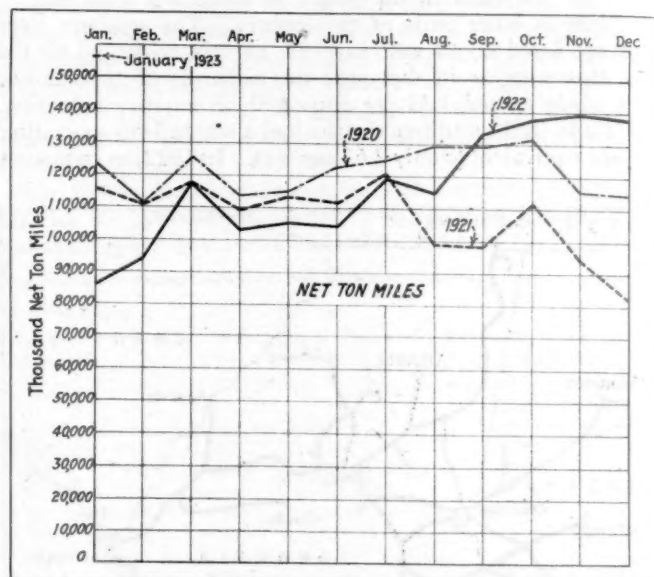
yearly. These dividends have been paid regularly since the issuance of the stock in 1912, when it was sold to the Illinois Central at par and the proceeds used to pay off three issues of income bonds concerning which there had been considerable litigation relative to the amount of interest payments. The Central of Georgia long term debt as of December 31, 1922, totaled \$48,997,426, a reduction of \$355,916, incidentally, from the total as of December 31, 1921. Interest on funded debt in 1922 totaled \$2,355,393; all of the bond issues are given a high rating.

The mileage of the Central of Georgia totals 1,921, of which 1,333 is in Georgia, 584 in Alabama and 4 in Tennessee.

see. Its lines extend from Savannah, Ga., to Atlanta; to Birmingham, Ala.; to Chattanooga, Tenn.; to Athens, Ga.; to Montgomery, Ala., etc. Connection is made with the parent Illinois Central at Birmingham, Ala., but a large volume of traffic between the lines of the two companies moves via the Nashville, Chattanooga & St. Louis between Atlanta, Ga., and Martin, Tenn. The traffic of the Central of Georgia is well diversified, products of agriculture in 1922 constituting 16.09 per cent of the total revenue tonnage; products of mines, 30.59 per cent; products of forests, 19.22 per cent, and manufactures, 24.72 per cent. The largest item included under products of mines is bituminous coal, which in 1922 made up 23.17 per cent of the total tonnage. A special feature of the road's traffic is perishables, including especially peaches and watermelons. The Central of Georgia serves the Georgia peach area and is said to be the largest originator of peaches of any road in the country. Its total traffic in peaches, the larger part of which it originates itself, is rapidly approaching 10,000 cars a season. Most of this business moves within a period of 30 days and the entire movement is confined to 60. Watermelon traffic similarly approaches 10,000 cars. A considerable volume of Florida perishables is received from the Atlantic Coast Line at Albany, Ga., moving thence to Atlanta or Birmingham, where it is delivered to connections.

In 1922, the Central of Georgia handled a total of 6,684,481 revenue tons of freight. This compared with 5,933,886 tons in 1921. It was not as great as the traffic handled in 1920—to date the company's busiest year—and it was slightly less than that handled in 1918, although the 1922 ton-miles exceeded those of that year. There is reproduced with this article a diagram on which are plotted the monthly figures of net ton-miles from January, 1920, to January, 1923, inclusive. This chart should prove of unusual interest. It shows, first, very plainly that the Central of Georgia was apparently not greatly handicapped by the shopmen's strike, this being indicated by the fact that the July and August net ton-miles were much in excess of those for May or June before the strike began. Other details will amplify this conclusion. The facts are that the Central of Georgia had by early in October recruited a 95 per cent normal shop force. In the three months of July, August and September, it handled a total of 200,708 loaded cars as against 189,135 for the three months previous to the strike, an increase of 11,573 revenue loads or 6.1 per cent. This volume of business was only 2,135 loads, or 1 per cent, less than the peak business of the road's history up to that time.—August, September and October, 1920. Further than that, during the three months'

nings of the story. The remaining interesting feature is the continuing heavy traffic since September. The peak month of 1920 was October. In no month of 1920, however, including October, did the net ton-miles exceed those moved in either September, October, November or December, 1922. But what is of greatest interest is the fact that in January, 1923, all previous records were again broken with a total net ton-miles not only in excess, but much in excess, of the figure for the best month of 1922 and almost double the figure for January a year ago. The start of the year 1923



Traffic on the Central of Georgia

is indeed auspicious and promises extremely good results for the present year.

Total freight revenues in 1922 were in excess of those for 1921, the 1922 total being \$15,893,822, as compared with \$14,565,644 in 1921, and an increase of \$1,328,178. Total revenues were \$23,286,737, an increase over 1921 of \$1,356,033. In spite of the increased traffic as between the two years, the management continued its success in lowering its operating expenses. The actual reduction was \$2,079,447, of which the larger part—\$1,228,122 was in transportation. The 1922 expenses totaled \$17,941,396 as compared with \$20,020,843 in 1921. The operating ratio was reduced from

CENTRAL OF GEORGIA TRAFFIC STATISTICS, 1918-1922

Year ended Dec. 31	Revenue freight	Revenue freight carried one mile	Revenue freight carried one mile of road	Average haul	Revenue from freight	Average rev. per ton per mile	Rev. freight carried per rev. freight and mixed train mile	Total operating revenues	Operating expenses	Net operating revenues	Corporate net after charges
1918	6,893,225	1,143,774,703	596,247	166	\$12,877,851	\$0.0113	453	\$20,692,888	\$16,046,496	\$4,646,392	1,205,287
1919	6,066,408	989,022,920	515,575	163	13,136,534	.0133	400	21,696,511	19,289,423	2,407,088	1,282,650
1920	7,517,302	1,283,298,476	666,849	171	15,485,718	.0121	431	25,082,288	25,733,367	Def. 651,079	1,516,707
1921	5,933,886	1,112,683,441	581,452	188	14,565,644	.0131	406	22,057,499	20,020,843	2,036,656	Def. 979,814
1922	6,684,481	1,264,422,162	658,876	189	15,893,822	.0125	434	23,286,737	17,941,396	5,345,341	2,065,812

period—July, August and September, 1920, the company operated 97.7 per cent of its passenger trains on schedule and it secured an on-time performance for fast freight trains, whereby 81 per cent were on time or maintained schedule. The Central of Georgia coal is from non-union mines. During July, August and September, 1922, more coal was loaded on the road than during any three months' period in the company's history. The loads totaled 6,174, an increase of 2,219 or 56 per cent over the three months preceding the shop strike.

The details for the first three months following the start of the shopmen's strike on July 1, however, tell only the begin-

90.77 in 1921 to 77.05 in 1922 and the economies of operation were such as to show a ratio of transportation expenses in 1922 of but 37.90 as compared with 45.57 in 1921. The reduction in transportation expenses is apparent in practically all the primary accounts, and noticeably in fuel.

The Central of Georgia at present has an unusually good equipment condition. At no time since the beginning of the shop strike has its percentage of locomotives held for repairs requiring over 24 hours gone more than 1 per cent over the 15 which the A. R. A. program of transportation efficiency has set as normal or as the average desired to be reached by the roads as a whole by October 15. On March 15, 1923, the



Central of Georgia's per cent was 13.8. Its bad order car percentage on that date was only 3.8, although during the summer of last year it was at one time up to 16.7 per cent, namely, on August 1. During 1922, the road acquired 500 new ventilated box cars, and rebuilt about 150 cars. It also ordered in 1922, 100 flat and 10 caboose cars, delivery of which had not been made by the end of the year. It has since ordered also 500 additional ventilated box cars, 100 stock, 300 hopper, 200 coal and 10 caboose cars, as well as 20 Mikado and 5 Mountain type locomotives. Two additional of the latter type were received during 1922 and at the end of the year the company was awaiting the delivery of 8 consolidations sent to the American Locomotive Company to be converted to Mikados.

To take care of the expected heavy traffic of 1923 and future years, the Central of Georgia plans to spend during the year for additions and betterments the sum of \$5,741,392. The equipment, most of which is mentioned above, will make up of this total, \$3,910,385. For yards and terminals, etc., there will be spent \$1,068,000; for shop tools, \$85,000, supplementing a like amount for tools now being installed; for steel and concrete culverts and bridges, \$325,000, and for new signals between Fort Valley and Albany, \$265,000. During the year the company plans to put in track 10,500 tons of 90-lb. rail and 500,000 creosoted cross-ties. During 1922 the company put in track 552,516 ties and laid 46 miles of track with 90-lb. rail. The track mileage to be laid with 90-lb. rail in 1923 figures up to about 72 miles. The 1923 rail program calls for the expenditure of \$676,200, of which \$87,907 will be chargeable to additions and betterments.

No reference to Central of Georgia activities would be complete without a reference to that company's policy of publicity. One of the features of this work is the absolutely frank manner in which the company gives to the people in its territory details such as those herein mentioned. Much of the information contained in this review has been obtained from copies of various advertisements which the company has run in the papers in the region which it serves.

## Garratt Articulated Locomotives

THE provision of locomotives of great tractive force for mountain sections or for the haulage of unusually heavy loads is a problem which has to be met on many roads. When the requirements have been too severe for the conventional types, such as 2-8-2, 2-10-2, etc., the alternative so far used has been the Mallet articulated locomotive. There is, however, another form of articulated locomotive now in use in Australia, Brazil, South Africa and elsewhere, which offers certain advantages and is of interest as another solution of the problem. This is the Garratt type which was introduced in 1909 on the Tasmanian Government Railways. This locomotive was of the 0-4-4-0 type, 2 ft. gage,

weight 71,700 lb., with compound cylinders and 16,250 lb. rated tractive force. Since that time the same type has been built for a number of other roads in several countries.

An example of a recent design of Garratt locomotives, shown in the accompanying illustration, was built for the South African Railways. These railways, which are of 3 ft. 6 in. gage, operate some of the most difficult sections of main line in the world. Continuous grades of 3 per cent are common, combined with uncompensated reverse curves of 19 deg., over which trains of 400 tons have to be handled at a speed of 10 miles per hour.

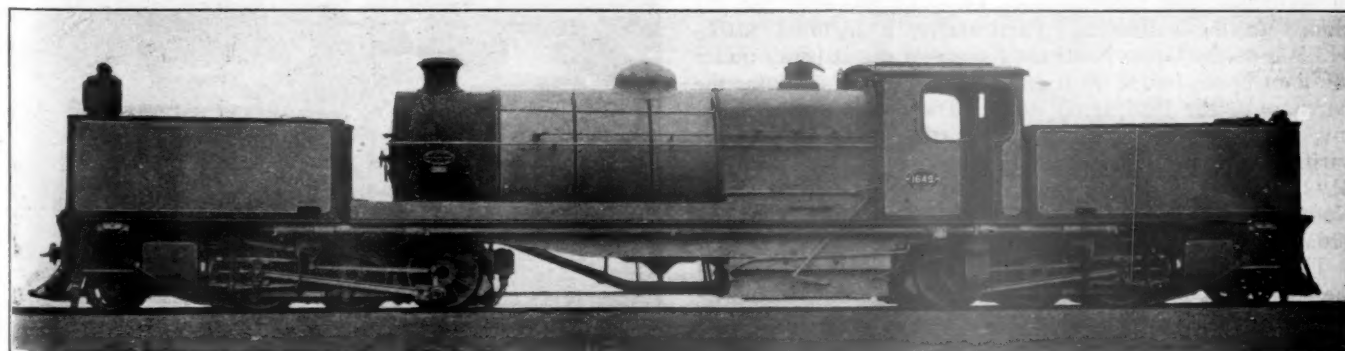
This locomotive, which is of the 2-6-6-2 type, was designed for freight traffic but has been used for heavy passenger trains. However, orders have recently been placed for two additional Garratt locomotives of the 2-6-2—2-6-2 type for certain passenger traffic.

The locomotive consists of three units: A boiler unit mounted on a girder frame carried at each end by an engine unit, each of which has a water or fuel tank built on to it. The pivot centers are located on the engine frames so as to give proper weight distribution. The Garratt locomotive is in reality simply two plain engines with one large boiler.

An important feature of the Garratt locomotive is the practically unlimited latitude permitted in the design of the boiler. The capacity may be all that is required, the grate area may be ample for even low grade fuels, while the volume of the firebox and the height from the grate to the crown sheet may be proportioned to give good combustion without resorting to an additional chamber. The firebox is thus a plain rectangular box—with a brick arch—constructed of three plates, tube plate, inner back head and wrapper sheet with but two seams and easily stayed. An unusual length of boiler barrel with long tubes is not required to give weight on the forward engine unit. As there are no axles underneath the ash pan, it can be of ample size and easy of access.

The distribution of the weight over the axles is positive, resulting from the location of the center or pivot castings. No weight adjusting links are required between the boiler and engine units and as there are no lateral control arrangements for centering the engine units, running is as free as with two separate small locomotives. The boiler unit when on a curve assumes the line of the chord instead of overhanging the outside as in the Mallet type, consequently high speed running is perfectly safe and a speed up to 60 miles per hour has been made on 3 ft. 6 in. gage track with 60-in. drivers. The Garratt locomotive is a true double ender and there is no need for turning at the end of the trip.

The South African locomotive shown weighs 299,650 lb. with tanks filled, of which 234,350 lb., or 78.3 per cent, is on the drivers. The load on any pair of wheels is less than 40,000 lb. The total length over couplers is 65 ft. 5 in., the length over pivot centers 33 ft. 3 in., the driving wheel base of the separate units 9 ft. and the total wheel base of the two units, 58 ft. 7 in. The driving wheels are



Garratt Locomotive of the 2-6-6-2 Type Built by Beyer, Peacock & Co. for the South African Railways

48 in. in diameter and the rated tractive force, 53,725 lb.

The boiler is 81 in. in diameter, carries 180 lb. steam pressure, has an evaporative heating surface of 2,554 sq. ft., of which 211 sq. ft. are in the firebox. There are 40 superheater units, Schmidt type, with 526½ sq. ft. heating surface. The grate area is 51.8 sq. ft.

The two engine units are practically alike with interchangeable cylinders, valve gear, rods, journal boxes, spring and brake rigging. The cylinders are 18 in. by 26 in. and develop 2,100 rated horsepower.

The ball joints of the live steam pipes are located directly under the pivot centers, being attached to the upper portion so that the ball simply rotates in its cup. The exhaust pipe ball joints are placed immediately to one side and provided with slip joints to allow of the slight longitudinal movement.

Nine tons of coal and 1,250 Imp. gal. of water are carried in the combined tank on the hind engine frame, the shoveling plate extending into the cab, so that the foot plate arrangements are the same as for a locomotive with a tender. The front tank holds 3,350 Imp. gal. of water, the level of the two tanks being equalized by a large pipe placed outside the boiler frame and fitted with flexible connections to the elbow pipes under the tanks.

The majority of the Garrett locomotives at present running have been designed and built by Beyer, Peacock & Co., Ltd., of Manchester, England. They range from small locomotives for 2-ft. gage track to those on the San Paulo, Brazil, which are used on 5 ft. 3 in. gage track.

## Tentative Valuations of the G. N. and the D. & H.

WASHINGTON, D. C.

**T**HE INTERSTATE COMMERCE COMMISSION on April 9 made public tentative valuation reports on the Great Northern as of June 30, 1915, and the Delaware & Hudson as of June 30, 1916, both reports being dated March 28.

The Great Northern report also includes that of its leased line, the Montana Eastern. After careful consideration of all facts contained in the report, "including appreciation, depreciation, going concern value, working capital and all other matters which appear to have a bearing upon the values here reported," the commission reports the final value of the property devoted to common carrier purposes to be \$391,740,302 for the property owned and \$395,353,655 for the property used. The property of the Great Northern wholly owned includes 7,089 miles of line and the length of line owned by the Montana Eastern is 83 miles. The capitalization of the Great Northern outstanding on the date of valuation was \$607,755,422, but this covers numerous investments in securities and miscellaneous physical property not included in the valuation. Particularly, it includes \$107,613,500 as the Great Northern's share of the liability under the joint bonds issued by it and the Northern Pacific for the purchase of the Burlington stock. The Great Northern has investments in other companies consisting principally of securities held for non-carrier purposes, of a par value of \$192,110,504, having a book value stated by the Great Northern as its net investment in other companies of \$227,076,312.

The valuation found by the commission, however, exceeds the company's investment in road and equipment, including land, on date of valuation, as stated in the Great Northern's books. This is stated as \$384,273,853. If readjustments were made as suggested by the commission this would be reduced to \$382,283,398.

The cost of reproduction new of the common carrier property other than land and materials and supplies is given as \$394,530,689 for the property owned and \$397,544,471 for the property used. The cost of reproduction less depreciation is given as \$329,390,215 for the property owned and \$332,830,863 for the property used. The present value of the common carrier lands owned is given as \$42,213,867 for 144,582 acres. The company also owns 7,647 acres of non-carrier lands, for which the commission reports the present value, including the value of improvements, as \$7,816,445. The Great Northern also had an investment in miscellaneous physical property recorded at \$4,076,260.

The final value of the carrier property of the Montana Eastern leased to the Great Northern is reported at \$4,550,000.

Final value of the carrier property owned by the Delaware & Hudson as of June 30, 1916, is given as \$57,232,412 for the property owned, which includes 342 miles of first main track and 631 miles of all tracks. For the carrier property used the report states the final value as \$95,834,979. This covers 788 miles of first main track and 1,715 miles of all tracks, of which 445 miles of first main track and 1,084 miles of all tracks were leased. The outstanding capitalization as of valuation date was \$106,127,600, which covers considerable property not included in the valuation. The investment in road and equipment as stated on the books of the carrier was \$68,642,567. If certain readjustments were made as suggested by the commission, this amount would be decreased to \$67,596,908. The cost of reproduction new of the common carrier property other than land is given as \$58,469,105 for the property owned and \$95,680,800 for the property used. The cost of reproduction less depreciation is given as \$43,277,518 for the property owned and \$72,982,077 for the property used. The present value of the carrier lands owned is given as \$5,883,347 and the lands used \$12,810,375. The carrier also owned 1,032 acres of land classified as non-carrier, which are given a present value of \$3,181,358. The carrier had recorded investments in other companies of a par value of \$53,577,137, which it carried at a book value of \$49,501,712. There is shown in the appendix under the heading "Miscellaneous Physical Property" the sum of \$10,280,864 as representing a balance shown by the carriers' books consisting of coal lands and other items. No part of this property is included in the property reported as held for purposes other than those of a common carrier and investments in other companies.



P. & A. Photo

Train 11 of the Big Four Wrecked by Automobile; Eight Persons Killed



## General News Department

The Canadian National will before long establish a pension system for superannuated employees, according to an announcement made by G. P. Graham, Acting Minister of Railways, in Parliament on April 9.

Alberta steam coal may be used by the Canadian Pacific as far east as Winnipeg, if the company's present plans are carried out. Heretofore the railway has not used this coal further east than Moose Jaw, Sask., but has depended upon supplies from the United States.

The freight station section of the American Railway Association will hold its annual meeting at St. Paul, Minn., on June 19, 20 and 21. All freight agents, whether connected with the Section or not, are cordially invited to attend. Information may be had from E. C. Harrison, local freight agent of the Great Northern, St. Paul.

W. D. Robb, vice-president of the Canadian National, on April 7 presented prizes (silver mesh bags) to 12 women employees of the Grand Trunk in appreciation of their work as members of railway first aid teams. Dr. J. Alex Hutchinson, chief medical officer of the company, and other officers attended at the presentation.

President Harding regards the railroad problem as one of the most important now before the country and expects to devote some attention to it in the speeches he will make on his forthcoming western trip on the way to Alaska, it was officially stated at the White House, following his return from Florida. The President now expects to leave Washington about June 20.

The Atchison, Topeka & Santa Fe announces that employees may become stockholders in the company through a new plan recently adopted. Stock will be purchased in the market by the road and held for employees, who may pay for it at the rate of \$10 a month. The limit of stock which may be bought on this plan is 10 shares, either common or preferred.

A silk banner has been presented to the employees in the Albina (Oregon) shops of the Union Pacific for having made the best safety record in 1922. Only nine injuries were recorded, which was at the rate of 3.72 injuries for each million man-hours of work. This surpasses all other shop records on the Union Pacific and is believed to be one of the best records ever made in a large shop in the United States.

A conciliation board has been appointed to sit at Winnipeg in connection with some grievances between sleeping car porters and the Canadian National porters. They claim some breaches of their agreement with the management, including a claim for back pay in connection with the amalgamation of the Grand Trunk Pacific with the Canadian National in 1920 and the re-instatement of employees who went out during the "one Big Union" strike. These porters were re-engaged as new men and so lost their service record. The Company disclaims any of the breaches alleged.

### Defends C. P. R. Guardianship

#### of Peace River Railway

The deputy minister of railways for Alberta, in his annual report to the legislature of the province last week, criticized the Canadian Pacific operation of the Edmonton, Dunvegan & British Columbia. D. C. Coleman, vice-president of the Canadian Pacific, in replying to this criticism, said that the provincial government only a few months ago had reported to him that the operation of the property was satisfactory in every way. He also called attention to the fact that the road under operation by the Canadian

Pacific received coal at a much lower price than could be obtained under any other arrangement. He characterized the charge of excessive operating expenses as a gross misrepresentation, pointing out the heavy grades met with in hauling freight out of the Peace river country.

### American Society of Civil Engineers Rejects

#### Proposal to Join Federation of Engineering Societies

The members of the American Society of Civil Engineers have rejected the proposal to join the Federated American Engineering Societies by a vote of 2,112 in favor and 3,645 against affiliation. This vote sustains the decision of the society two years ago when a similar proposal was rejected.

### Hearings on Efficiency of

#### Management Begin on April 23

Division 5 of the Interstate Commerce Commission is to begin hearings at Washington on April 23 in connection with its investigation of the economy and efficiency of railroad management. The first hearing is to be devoted to the Lehigh Valley, which on March 15 had 35.8 per cent of its locomotives out of service awaiting repairs requiring over 24 hours.

### Spring Meeting of A. S. C. E.

The American Society of Civil Engineers will hold its spring meeting at New Orleans, La., on April 18-21, the topic for consideration being the river and harbor problems of the lower Mississippi. Among the papers which will be presented are one on the "Revival of Commercial Transportation on the Mississippi River" by M. J. Sanders, manager, International Mercantile Marine and the Frederick Leyland Company, Ltd., New Orleans, La., and another on the "Economics of Transportation on the Mississippi River" by Hon. Joseph E. Ransdell, United States Senator from Louisiana, Lake Providence, La.

### Proposal to Reduce Canadian Northern

#### Rates Made in Manitoba Legislature

Revival of an old agreement whereby the Canadian Northern was to fix rates in Manitoba as ordered by the provincial government is urged by the leader of the conservatives in the provincial legislature. The Canadian Northern, which is now a part of the Canadian National, originally made this agreement with Manitoba in return for a provincial guarantee for an issue of bonds. The agreement also stipulated that passenger rates were not to exceed three cents a mile. If the terms of this agreement should be restored, an estimated loss in revenues of \$10,000,000 would result.

### Railway Women Employees to Visit France

The American Committee for the Relief of Devastated France has announced that 95 women, apparently all representing people in New York City or places nearby, have been chosen by popular vote to membership in the Good Will Delegation, to be guests of the committee on a trip to France, starting May 23. The sum contributed in connection with this voting contest was \$596,161. The women representing railroads are: New York Central, Lillian E. Hummell, Grace E. Sheffer, Ida M. Henry, Mrs. Violet Sullivan, Henrietta Carson; Delaware & Hudson, Mildred Ferris, Mary V. Manley; Lehigh Valley, Helen Strimple; Long Island, Kittie Donnelly. The votes for candidates among the employees of Durant motors resulted in sending 10 women, and the Western Union Telegraph Company sends 15; Postal Telegraph, 5.

## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1923

Name of road	Average mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net from railway operation	Operating income (or loss)	Net after rentals	Net after rentals 1922
		Freight	Passenger	Total (inc. misc.)	Way and structures	Maintenance of equipment	Traffic					
Akron, Canton & Youngstown.....	Feb. 170	\$192,823	\$798	\$203,917	\$26,117	\$17,005	\$7,662	58.90	\$83,790	\$70,126	\$47,101	\$48,019
Albama & Vicksburg.....	2 mos. 1,704	368,812	1,704	370,516	52,250	36,478	14,641	61.41	120,989	125,257	80,387	91,282
Albama & Vicksburg.....	2 mos. 1,411	181,373	408,024	249,306	34,498	51,444	5,509	83.10	125,387	18,887	30,881	16,610
Albama & Vicksburg.....	2 mos. 1,411	419,257	108,518	568,217	99,393	99,393	18,118	75.50	139,038	87,614	16,610	25,698
Vicks, Shreveport & Pacific.....	Feb. 171	216,965	80,513	325,531	43,001	61,609	10,185	75.40	80,024	56,814	44,020	33,111
Ann Arbor.....	2 mos. 171	452,423	276,592	666,173	91,863	120,841	20,339	73.30	183,431	133,395	111,000	36,663
Ann Arbor.....	2 mos. 293	2,840,303	32,655	3,272,322	34,770	105,394	13,704	110.50	34,361	56,826	99,917	38,050
Ann Arbor.....	2 mos. 293	664,562	76,853	773,781	63,652	246,536	18,023	99.60	2,811	42,096	103,772	35,776
Atchison, Topeka & Santa Fe.....	Feb. 8,527	9,470,385	3,451,287	14,170,447	1,355,512	3,650,890	273,247	73.00	3,819,526	2,517,355	2,902,701	1,585,067
Atchison, Topeka & Santa Fe.....	2 mos. 8,922	20,869,436	7,277,525	30,619,347	2,819,838	7,375,945	563,923	70.50	9,024,013	6,459,119	6,867,264	2,473,231
Gulf, Colo. & Santa Fe.....	Feb. 1,908	1,242,574	279,212	1,624,530	532,280	476,190	43,273	93.70	103,098	21,888	23,257	198,985
Gulf, Colo. & Santa Fe.....	2 mos. 1,908	2,877,988	611,394	3,694,404	700,347	932,965	90,760	85.00	55,822	392,715	27,628	402,664
Panhandle & Santa Fe.....	Feb. 857	398,079	88,744	517,732	52,023	179,877	7,401	84.00	82,883	56,441	34,205	19,356
Panhandle & Santa Fe.....	2 mos. 857	821,138	204,500	1,141,040	128,739	364,588	15,807	81.70	209,139	160,375	102,676	120,262
Atlanta & West Point.....	Feb. 93	134,613	67,680	223,255	23,127	41,173	8,725	73.30	59,545	45,217	36,270	10,172
Atlanta & West Point.....	2 mos. 93	268,410	149,091	463,931	59,890	87,858	16,916	72.70	98,599	72,079	52,750	16,780
Western of Alabama.....	Feb. 133	147,246	63,876	228,320	29,618	74,298	9,840	71.90	57,193	45,153	43,229	2,707
Western of Alabama.....	2 mos. 133	291,682	138,157	466,686	58,954	91,737	18,991	76.60	109,241	84,832	79,916	13,516
Atlanta, Birm. & Atlantic.....	Feb. 639	312,252	40,255	374,665	57,709	82,980	23,404	99.90	387	14,236	28,027	78,644
Atlanta, Birm. & Atlantic.....	2 mos. 639	648,510	85,090	777,591	122,434	173,442	46,254	99.60	2,442	25,527	52,130	176,587
Atlantic Coast Line.....	Feb. 4,860	4,834,727	1,969,844	7,266,476	703,084	1,277,047	124,261	65.70	2,494,190	2,143,351	1,994,295	1,544,964
Atlantic Coast Line.....	2 mos. 4,860	9,656,547	3,826,646	14,382,207	1,456,945	2,554,945	226,335	66.50	4,817,981	4,116,793	3,914,686	2,388,438
Charleston & West. Carolina.....	Feb. 342	263,194	30,777	306,420	45,766	41,217	7,083	76.30	72,710	61,711	46,405	36,960
Charleston & West. Carolina.....	2 mos. 342	523,919	68,967	617,456	87,844	76,227	13,364	73.10	166,328	144,271	118,288	41,649
Baltimore & Ohio.....	Feb. 5,212	15,623,695	1,957,261	18,692,393	2,050,136	4,249,603	327,961	79.50	3,752,355	2,031,434	2,522,158	2,071,125
Baltimore & Ohio.....	2 mos. 5,212	32,828,511	4,158,034	39,249,363	4,100,437	8,682,680	639,932	77.90	8,696,024	7,043,781	6,131,652	5,094,220
Balti. & Ohio Chicago Term.....	Feb. 83	.....	.....	262,787	21,140	33,143	1,668	92.30	20,323	23,902	19,593	84,609
Balti. & Ohio Chicago Term.....	2 mos. 83	.....	.....	556,518	19,825	69,143	3,432	86.40	75,502	13,145	68,456	152,709
Staten Isl. Rapid Transit.....	Feb. 23	68,222	71,168	132,889	25,044	25,892	1,687	114.10	21,543	39,123	31,747	21,482
Staten Isl. Rapid Transit.....	2 mos. 23	148,215	153,693	300,633	54,648	66,085	3,530	114.00	46,415	81,557	110,830	37,523
Bangor & Arostock.....	Feb. 616	78,711	65,239	143,950	10,136	120,798	4,043	89.50	51,322	15,212	66,691	186,978
Bangor & Arostock.....	2 mos. 616	798,776	146,269	987,067	219,331	219,331	8,439	90.60	92,989	32,685	114,436	37,627
Belt Ry. of Chicago.....	Feb. 32	.....	.....	552,255	26,359	62,469	2,245	67.30	180,859	149,770	130,652	152,754
Belt Ry. of Chicago.....	2 mos. 32	.....	.....	1,173,070	60,776	136,113	4,692	67.80	377,640	312,962	304,046	285,121
Bessemer & Lake Erie.....	Feb. 228	870,118	27,196	920,607	67,637	391,934	12,909	93.80	57,500	28,286	24,387	16,423
Bessemer & Lake Erie.....	2 mos. 228	1,993,932	59,264	2,101,927	137,184	770,804	29,898	83.50	348,254	289,840	781,979	121,456
Bingham & Garfield.....	Feb. 34	32,095	10	32,094	2,163	5,225	1,336	60.50	13,031	2,335	13,747	21,482
Bingham & Garfield.....	2 mos. 34	63,192	10	65,183	8,225	9,046	2,928	67.00	21,498	7,957	13,747	21,482
Boston & Maine.....	Feb. 2,286	3,534,974	1,721,611	5,931,100	1,034,441	1,587,777	48,451	108.50	507,336	740,921	1,281,805	358,453
Boston & Maine.....	2 mos. 2,286	7,196,712	3,613,554	12,244,159	2,262,917	3,244,671	98,246	109.80	1,198,931	1,683,922	2,780,895	240,502
Brooklyn East. Dist. Term.....	Feb. 9	121,631	.....	121,631	4,650	12,962	132	54.90	38,469	52,654	52,654	44,211
Brooklyn East. Dist. Term.....	2 mos. 9	248,592	.....	248,592	9,303	25,633	268	53.70	124,212	112,185	112,185	77,381
Buffalo & Susquehanna.....	Feb. 253	228,048	5,700	237,179	34,150	72,311	1,985	82.60	41,377	27,477	80,753	62,996
Buffalo & Susquehanna.....	2 mos. 253	490,406	11,793	509,413	70,645	161,339	3,975	83.30	85,293	57,792	159,344	91,655
Buffalo, Rochester & Pittsburgh.....	Feb. 589	1,804,806	134,755	1,995,600	197,270	746,529	22,753	89.70	204,763	169,580	256,790	270,303
Buffalo, Rochester & Pittsburgh.....	2 mos. 589	3,723,437	289,056	4,128,175	375,112	1,552,615	47,370	89.40	436,525	366,336	558,092	430,987
Canadian Pacific (Lines in Me.).....	Feb. 233	258,555	36,478	311,959	20,990	53,155	5,127	74.60	79,134	64,134	50,373	1,080
Canadian Pacific (Lines in Me.).....	2 mos. 233	540,180	71,697	646,722	46,924	111,718	10,059	75.70	157,140	127,140	102,690	14,744
Carolina, Clinchfield & Ohio.....	Feb. 309	604,710	36,833	652,743	81,805	192,810	23,195	76.40	133,944	103,836	146,238	191,188
Carolina, Clinchfield & Ohio.....	2 mos. 309	1,280,339	75,991	1,380,368	109,646	391,413	48,933	73.00	363,269	263,130	347,930	383,414
Central of Georgia.....	Feb. 1,920	1,509,991	467,139	2,175,738	245,293	415,089	76,669	76.70	518,430	409,764	402,024	251,433
Central of Georgia.....	2 mos. 1,920	2,984,521	956,314	4,174,485	521,275	830,855	143,371	78.20	940,927	731,401	727,440	310,227
Central of New Jersey.....	Feb. 694	3,248,419	647,143	4,035,034	410,508	888,835	59,202	85.90	569,978	258,907	236,687	314,013
Central of New Jersey.....	2 mos. 694	6,683,899	1,306,932	8,419,606	905,654	1,992,349	87,097	88.30	983,918	376,046	325,934	508,012
Central Vermont.....	Feb. 532	429,477	108,920	603,328	68,494	116,699	15,332	100.30	2,013	22,565	86,661	5,802
Central Vermont.....	2 mos. 532	883,843	218,280	1,191,123	143,997	241,678	33,850	105.90	71,753	112,868	246,303	59,987
Chesapeake & Ohio.....	Feb. 2,552	5,752,762	730,896	6,819,789	669,433	1,945,481	80,483	80.70	1,315,135	1,011,112	1,060,133	1,439,885
Chesapeake & Ohio.....	2 mos. 2,552	12,193,945	1,567,143	14,462,470	1,490,785	4,062,178	164,662	79.80	2,914,454	2,306,405	2,434,653	2,468,035
Chicago & Alton.....	Feb. 1,050	1,773,598	465,289	2,420,878	299,268	775,408	52,547	88.10	288,609	206,780	79,833	471,077
Chicago & Alton.....	2 mos. 1,050	3,942,672	1,015,807	5,263,020	537,154	1,601,722	111,890	82.00	964,307	801,167	564,759	644,730
Chicago & Eastern Ill.....	Feb. 945	1,731,611	340,809	2,308,080	203,893	702,391	43,190	87.00	770,121	169,551	226,632	317,427
Chicago & Eastern Ill.....	2 mos. 945	3,782,936	763,072	5,248,408	421,341	1,537,981	86,616	85.40	1,712,538	599,778	660,492	577,921
Chicago & North Western.....	Feb. 8,462	8,405,410	2,107,525	11,448,293	1,448,293	2,901,693	316,621	88.40	1,332,833	581,012	358,723	309,797
Chicago & North Western.....	2 mos. 8,462	17,359,221	4,458,024	23,978,873	2,978,873	6,175,264	630,168	88.70	2,945,933	1,442,350	1,115,684	158,493
Chicago, Burl. & Quincy.....	Feb. 9,393	10,123,670	1,891,038	13,126,287	936,465	3,253,122	184,029	79.10	2,747,904	1,809,324	1,598,816	2,403,745
Chicago, Burl. & Quincy.....	2 mos. 9,393	21,758,071	4,143,935	28,310,324	1,965,071	6,853,466	377,777	76.30	6,607,739	4,800,496	4,481,703	3,555,701
Chicago Great Western.....	Feb. 1,496	1,435,279	309,476	1,835,070	158,998	416,209	62,032	85.70	269,208	186,062	94,864	19,232
Chicago Great Western.....	2 mos. 1,496	3,021,443	687,666	4,006,188	338,042	952,295	131,199	84.90	605,318	436,453	270,335	181,967



## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1923—CONTINUED

Name of road	Average mileage operated during period	Operating revenues				Operating expenses				Operating ratio	Net from railway operation	Operating income (or loss)	Net after rentals, 1922
		Freight	Passenger	Total	Maintenance of way and structures	Equip. ment	Traffic	Trans- portation	General	Total			
Chic., Ind. & Louisville.....	Feb. 657	\$1,010,567	\$204,948	\$1,215,515	\$122,793	\$306,700	\$32,945	\$544,755	\$36,146	\$1,053,133	\$273,975	\$217,580	\$101,877
Chic., Ind. & Louisville.....	2 mos. 657	2,036,072	458,171	2,494,243	251,212	602,445	63,848	1,116,099	70,894	2,133,379	629,532	507,701	230,638
Chicago, Milwaukee & St. Paul.....	Feb. 11,025	9,565,846	1,623,536	11,189,382	1,136,682	3,212,640	186,103	5,618,693	298,037	10,507,612	1,839,070	1,048,420	599,747
Chicago, Milwaukee & St. Paul.....	2 mos. 11,025	20,734,136	3,616,976	24,351,112	2,208,344	7,015,040	375,685	11,726,407	624,309	22,055,017	4,761,904	3,181,224	2,424,166
Chicago, Peoria & St. Louis.....	Feb. 247	79,129	33,666	112,795	15,479	23,416	66,273	9,504	9,504	117,562	16,382	25,960	43,703
Chicago, Peoria & St. Louis.....	2 mos. 247	214,116	29,324	243,440	37,992	55,098	159,213	19,515	19,515	278,302	40,488	69,436	62,675
Chicago River & Indiana.....	Feb. 28	.....	.....	.....	68,572	68,572	232,869	11,341	11,341	362,611	33,900	204,488	252,734
Chicago River & Indiana.....	2 mos. 28	.....	.....	.....	149,677	149,677	491,737	21,079	21,079	764,541	442,765	373,475	542,759
Chicago, Rock Isl. & Pacific.....	Feb. 7,635	6,137,323	1,794,442	7,931,765	1,087,289	2,417,692	166,399	4,232,544	239,702	8,192,638	371,219	126,986	480,345
Chicago, Rock Isl. & Pacific.....	2 mos. 7,635	13,705,127	3,927,758	17,632,885	2,930,809	4,790,361	383,631	8,807,158	488,074	16,957,191	1,973,057	954,238	331,109
Chic., Rock Isl. & Gulf.....	Feb. 461	252,044	170,442	422,486	354,456	66,294	12,994	203,360	14,724	357,249	77,809	53,137	20,542
Chic., Rock Isl. & Gulf.....	2 mos. 461	614,017	150,170	764,187	117,082	143,362	25,442	438,675	28,310	755,151	90,770	53,137	20,542
Chicago, St. P., Minn. & Omaha.....	Feb. 1,749	1,483,551	453,469	1,937,020	2,066,761	187,931	32,778	1,146,992	66,663	1,881,759	185,002	54,238	70,505
Chicago, St. P., Minn. & Omaha.....	2 mos. 1,749	3,234,261	978,338	4,212,600	4,487,681	908,961	66,688	2,334,056	139,790	3,861,034	626,647	350,297	385,794
Cincin., Indianapolis & Western.....	Feb. 347	300,473	37,748	338,221	367,913	81,591	11,782	181,661	18,827	322,467	45,446	27,092	1,282
Cincin., Indianapolis & Western.....	2 mos. 347	651,533	82,115	733,648	794,840	168,331	22,037	383,445	37,520	671,594	123,246	85,565	14,185
Colorado & Southern.....	Feb. 1,099	717,277	129,231	846,508	106,829	287,269	15,177	407,048	40,881	862,611	44,013	19,240	7,279
Colorado & Southern.....	2 mos. 1,099	1,580,601	293,069	1,873,670	2,219,444	640,113	31,342	872,513	84,260	1,664,049	150,787	22,203	25,073
Ft. Worth & Denver City.....	Feb. 436	482,552	132,565	615,117	646,819	52,704	11,376	215,367	31,550	498,513	148,306	110,786	146,319
Ft. Worth & Denver City.....	2 mos. 436	1,015,665	294,288	1,309,953	1,379,471	111,942	19,325	463,693	68,878	1,047,391	332,080	242,978	312,426
Wichita Valley.....	Feb. 256	72,870	14,721	87,591	201,556	27,570	66	38,333	1,479	70,455	21,898	16,258	7,998
Wichita Valley.....	2 mos. 256	156,669	33,626	190,295	401,524	55,140	126	76,666	3,681	151,530	50,136	37,353	10,825
Columbus & Greenville.....	Feb. 167	73,862	24,862	98,724	28,949	20,350	2,660	41,414	8,139	51,553	14,047	30,424	12,306
Columbus & Greenville.....	2 mos. 167	173,236	59,170	232,406	246,089	66,324	6,475	88,978	16,728	207,822	38,267	32,186	16,989
Delaware & Hudson.....	Feb. 886	2,466,774	297,616	2,764,390	2,954,654	288,677	32,794	1,615,980	141,617	3,150,183	195,529	680,417	940,762
Delaware & Hudson.....	2 mos. 886	5,185,077	607,347	5,792,424	6,204,170	607,048	73,743	3,312,857	286,945	6,704,683	500,513	270,101	1,375,574
Delaware, Lackawanna & Western.....	Feb. 993	4,504,244	1,005,047	5,509,291	491,006	2,005,611	105,105	3,046,224	147,021	5,843,405	300,180	21,843	75,355
Delaware, Lackawanna & Western.....	2 mos. 993	9,269,350	2,130,260	11,399,610	1,036,301	4,004,677	214,190	6,301,335	297,117	11,956,414	948,628	125,254	339,159
Denver & Rio Grande Western.....	Feb. 2,593	1,838,084	359,118	2,197,202	2,321,656	798,777	43,069	983,123	80,480	2,174,203	202,960	34,821	70,498
Denver & Rio Grande Western.....	2 mos. 2,593	3,852,985	755,876	4,608,861	5,243,329	1,723,750	91,088	2,107,771	165,866	4,750,025	338,782	24,581	48,723
Denver & Salt Lake.....	Feb. 255	128,402	12,414	140,816	160,045	69,340	844	173,486	1,656	175,025	109,400	21,034	16,980
Denver & Salt Lake.....	2 mos. 255	257,238	27,141	284,379	363,003	144,520	1,855	354,800	3,339	360,286	57,283	25,337	65,264
Detroit & Mackinac.....	Feb. 385	88,874	121,969	210,843	18,493	46,850	1,715	59,733	5,268	131,903	108,200	21,710	10,893
Detroit & Mackinac.....	2 mos. 385	171,178	243,100	414,278	37,337	88,195	3,593	124,860	10,547	264,620	17,529	39,831	17,064
Detroit & Toledo Shore Line.....	Feb. 61	270,693	275,352	546,045	19,731	54,763	2,913	91,586	6,949	141,073	51,200	116,209	40,489
Detroit & Toledo Shore Line.....	2 mos. 61	634,899	680,955	1,315,854	40,286	109,286	5,913	205,215	13,255	318,712	327,424	290,824	184,748
Detroit, Toledo & Ironton.....	Feb. 454	655,995	8,819	664,814	680,955	65,418	6,120	271,333	23,611	486,853	194,102	181,539	39,615
Detroit, Toledo & Ironton.....	2 mos. 454	1,398,064	19,686	1,417,750	1,450,626	140,703	13,129	599,585	45,634	1,079,299	371,327	346,079	108,910
Duluth & Iron Range.....	Feb. 279	154,183	19,106	173,289	53,038	116,015	1,094	162,443	21,531	354,643	167,129	167,558	163,634
Duluth & Iron Range.....	2 mos. 279	284,403	41,465	325,868	108,042	246,545	1,969	321,543	35,953	714,930	340,125	363,186	321,002
Duluth, Missabe & Northern.....	Feb. 305	98,923	21,320	120,243	94,215	177,849	2,583	172,966	24,200	473,369	323,890	303,029	401,698
Duluth, Missabe & Northern.....	2 mos. 305	183,998	42,351	226,349	194,382	375,266	5,445	346,981	43,870	969,171	680,976	841,785	808,266
Duluth, South Shore & Atlantic.....	Feb. 591	246,693	79,570	326,263	43,478	70,936	5,438	220,182	10,709	355,484	2,176	32,233	37,440
Duluth, South Shore & Atlantic.....	2 mos. 591	557,327	189,151	746,478	84,185	151,032	11,847	476,912	22,634	757,338	48,146	11,916	152,538
Duluth, Winnipeg & Pacific.....	Feb. 178	200,578	22,786	223,364	33,374	48,037	3,374	105,871	5,459	196,115	85,300	22,249	26,239
Duluth, Winnipeg & Pacific.....	2 mos. 178	381,860	48,732	430,592	61,755	75,883	6,789	202,846	11,042	358,315	80,800	65,112	63,065
Elgin, Joliet & Eastern.....	Feb. 459	1,807,860	5	1,807,865	126,591	537,050	11,962	711,185	35,339	1,421,729	594,759	520,013	378,942
Elgin, Joliet & Eastern.....	2 mos. 459	3,856,220	22	3,856,242	2,016,488	258,738	24,208	1,426,425	72,234	2,915,647	1,380,499	1,230,704	860,175
El Paso & Southwestern.....	Feb. 1,139	709,795	175,769	885,564	939,120	198,454	30,307	266,826	40,170	742,808	196,312	170,613	129,202
El Paso & Southwestern.....	2 mos. 1,139	1,488,202	383,559	1,871,761	1,975,737	406,774	60,119	540,327	81,160	1,495,276	379,468	329,468	255,338
Erie.....	Feb. 2,039	7,809,882	9,316,309	17,126,191	760,617	2,783,363	133,932	4,348,704	261,938	8,330,764	985,345	679,596	732,243
Erie.....	2 mos. 2,039	15,797,007	19,810,331	35,607,338	1,652,040	5,839,706	276,071	8,935,867	544,917	17,351,853	1,616,781	1,001,117	1,076,604
Chicago & Erie.....	Feb. 269	859,464	40,329	900,793	82,544	188,500	15,458	463,830	35,204	785,046	160,248	110,420	244,723
Chicago & Erie.....	2 mos. 269	1,767,892	82,455	1,850,347	181,051	377,857	37,674	979,967	76,082	1,650,823	315,843	217,353	444,777
New Jersey & New York.....	Feb. 45	23,542	88,998	112,540	9,972	22,676	1,410	67,652	3,887	106,193	90,800	7,889	19,711
New Jersey & New York.....	2 mos. 45	52,950	180,221	233,171	22,860	50,671	2,694	147,842	7,360	231,363	106,960	4,256	50,844
N. Y., Susq. & Western.....	Feb. 135	270,815	17,130	287,945	55,648	53,328	3,734	245,021	12,345	372,073	101,300	73,002	32,516
N. Y., Susq. & Western.....	2 mos. 135	545,895	37,501	583,396	100,034	100,034	7,444	494,640	24,016	770,262	830,340	735,100	671,410
Florida East Coast.....	Feb. 764	799,738	178,535	978,273	1,724,118	184,034	14,460	463,187	27,233	893,778	1,416,077	1,265,297	1,137,934
Florida East Coast.....	2 mos. 764	1,592,373	3,220,360	4,812,733	3,667,779	380,783	36,400	914,757	59,086	1,806,313	56,100	1,265,297	1,137,934
Ft. Smith & Western.....	Feb. 249	89,890	20,841	110,731	19,231	25,854	4,773	46,475	7,401	105,476	88,600	13,590	1,990
Ft. Smith & Western.....	2 mos. 249	196,564	45,639	242,203	42,148	58,602	9,867	96,667	14,510	223,596	37,265	32,505	12,975
Galveston Wharf.....	Feb. 13	.....	.....	.....	106,263	2,873	2,873	33,337	6,121	159,175	71,600	73,472	39,412
Galveston Wharf.....	2 mos. 13	.....	.....	.....	232,597	5,223	1,266	60,495	6,121	159,175	71,600	73,472	39,412
Georgia.....	Feb. 328	326,510	87,818	414,328	48,788	92,782	20,394	207,890	18,582	388,630	88,500	44,082	33,973
Georgia.....	2 mos. 328	669,143	190,610	859,753	101,016	183,641	42,049	438,271	37,502	802,864	109,164	96,335	80,019
Georgia & Florida.....	Feb. 405	132,554	16,736	149,290	17,260	20,567	8,335	60,606	6,706	113,767	72,720	42,598	36,316
Georgia & Florida.....	2 mos. 405	238,660	35,271	273,931	34,332	37,393	16,097	117,941	13,757	219,549	68,578	55,897	40,039

# REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1923—CONTINUED

## Name of road

Average mileage  
operated  
during  
period.

Operating revenues

Freight. Passenger. (inc. misc.)

Total

Way and  
structures.

Maintenance of  
equip-  
ment.

Operating expenses

Traffic.

Trans-  
portation.

General.

Total.

Operating  
ratio.

Net  
from  
railway  
operation.

Operating  
income  
(or loss).

Net  
after  
rentals.

Net after  
rentals.

Grand Trunk Western.....Feb. 347 \$1,037,133

Atlantic & St. Lawrence.....2 mos. 347 \$1,588,818

Chic., Det. & Can. Gr. Tr. Jct.....Feb. 166 312,732

Chic., Det. & Can. Gr. Tr. Jct.....2 mos. 166 312,732

Det., Gr. Haven & Milwaukee.....Feb. 166 312,732

Det., Gr. Haven & Milwaukee.....2 mos. 166 312,732

Great Northern.....Feb. 189 394,124

Great Northern.....2 mos. 189 394,124

Green Bay & Western.....Feb. 234 1,197,908

Green Bay & Western.....2 mos. 234 1,197,908

Gulf Coast Lines.....Feb. 234 1,197,908

Gulf Coast Lines.....2 mos. 234 1,197,908

Gulf & Ship Island.....Feb. 307 1,822,279

Gulf & Ship Island.....2 mos. 307 1,822,279

Gulf, Mobile & Northern.....Feb. 307 1,822,279

Gulf, Mobile & Northern.....2 mos. 307 1,822,279

Hocking Valley.....Feb. 433 371,822

Hocking Valley.....2 mos. 433 371,822

Illinois Central.....Feb. 433 371,822

Illinois Central.....2 mos. 433 371,822

Yazoo & Mississippi Valley.....Feb. 433 371,822

Yazoo & Mississippi Valley.....2 mos. 433 371,822

International & Great Northern.....Feb. 433 371,822

International & Great Northern.....2 mos. 433 371,822

Kans. City, Mex. & Orient.....Feb. 433 371,822

Kans. City, Mex. & Orient.....2 mos. 433 371,822

Kans. City Southern.....Feb. 433 371,822

Kans. City Southern.....2 mos. 433 371,822

Texas Eastern.....Feb. 433 371,822

Texas Eastern.....2 mos. 433 371,822

Kansas, Oklahoma & Gulf.....Feb. 433 371,822

Kansas, Oklahoma & Gulf.....2 mos. 433 371,822

Lake Superior & Ishpeming.....Feb. 433 371,822

Lake Superior & Ishpeming.....2 mos. 433 371,822

Lake Terminal.....Feb. 433 371,822

Lake Terminal.....2 mos. 433 371,822

Lehigh & Hudson River.....Feb. 433 371,822

Lehigh & Hudson River.....2 mos. 433 371,822

Lehigh Valley.....Feb. 433 371,822

Lehigh Valley.....2 mos. 433 371,822

Los Angeles & Salt Lake.....Feb. 433 371,822

Los Angeles & Salt Lake.....2 mos. 433 371,822

Louisiana & Arkansas.....Feb. 433 371,822

Louisiana & Arkansas.....2 mos. 433 371,822

Louisiana Ry. & Nav.....Feb. 433 371,822

Louisiana Ry. & Nav.....2 mos. 433 371,822

Louisville & Nashville.....Feb. 433 371,822

Louisville & Nashville.....2 mos. 433 371,822

Louisville, Henderson & St. Louis.....Feb. 433 371,822

Louisville, Henderson & St. Louis.....2 mos. 433 371,822

Maine Central.....Feb. 433 371,822

Maine Central.....2 mos. 433 371,822

Midland Valley.....Feb. 433 371,822

Midland Valley.....2 mos. 433 371,822

Minneapolis & St. Louis.....Feb. 433 371,822

Minneapolis & St. Louis.....2 mos. 433 371,822

Minn., St. Paul & S. S. Marie.....Feb. 433 371,822

Minn., St. Paul & S. S. Marie.....2 mos. 433 371,822

Mississippi Central.....Feb. 433 371,822

Mississippi Central.....2 mos. 433 371,822

Missouri & North Arkansas.....Feb. 433 371,822

Missouri & North Arkansas.....2 mos. 433 371,822

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Missouri & North Arkansas.....2 mos. 433 371,822

Missouri & North Arkansas.....Feb. 433 371,822

Missouri & North Arkansas.....2 mos. 433 371,822



Continued

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1922

Name of road	Average mileage operated during period.	Operating revenues			Maintenance of way and structures.		Operating expenses			Operating income (or loss).	Net from railway operation.	Net after rentals 1922.			
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equip- ment.	Traffic.	Trans- portation.	General.				Total.		
1,670 \$1,788,154	Missouri, Kansas & Texas.....	329	\$431,002	\$2,441,079	\$207,328	\$869,653	\$51,861	\$847,454	\$112,021	\$2,096,081	85.90	\$344,998	\$220,680	\$339,552	\$699,863
1,670 3,938,353	Mo., Kans. & Tex. of Tex.....	329	922,568	5,311,111	1,742,753	1,742,753	1,742,753	1,742,753	213,224	4,226,000	80.80	1,013,950	739,992	932,750	1,026,832
1,738 2,177,640	Mo., Kans. & Tex. of Tex.....	329	771,428	3,238,839	402,763	761,336	38,724	1,479,819	609,399	2,947,785	91.00	291,054	176,457	280,817	116,233
329 65,426	Wichita Falls & Northwestern.....	329	13,914	84,923	19,310	17,062	1,683	40,253	6,473	83,018	97.80	1,905	3,362	16,600	13,892
329 141,766	Missouri Pacific.....	329	30,355	182,865	40,276	40,434	2,640	87,400	30,200	199,018	108.80	16,153	38,686	63,409	49,126
7,171 12,556,215	Missouri Pacific.....	7,171	1,318,736	7,601,442	996,624	2,010,979	149,631	3,430,983	236,067	6,846,932	90.10	754,310	373,429	1,756	49,126
1,165 1,629,318	Mobile & Ohio.....	1,165	142,659	1,598,272	187,083	362,568	45,653	597,734	44,077	1,237,462	77.40	360,810	268,354	247,198	166,817
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346	3,095,550	384,476	851,891	92,561	1,253,146	91,214	2,673,910	76.30	831,640	661,545	576,156	278,505
1,165 3,020,707	Mobile & Ohio.....	1,165	310,346												

## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1923—CONTINUED

Name of road	Average mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net from operation	Operating income (or loss)	Net rentals	Net after rentals
		Freight	Passenger	Total (inc. misc.)	Way and structures	Maintenance of equipment	Traffic					
Parkinson	41	\$74,384	\$5,743	\$80,127	\$5,628	\$3,275	\$106	55.10	\$37,586	\$42,541	\$28,087	\$22,179
Port Reading	21	168,750	11,875	180,625	18,304	7,016	214	51.00	96,084	84,541	72,887	39,567
	21	199,311	255,063	454,374	12,124	6,673	229	51.00	112,152	99,094	19,394	59,536
	21	465,459	579,883	1,045,342	26,128	17,380	224	55.80	306,314	279,166	109,520	67,207
Pittsburgh & Shawmut	102	112,706	5,197	117,903	19,875	41,919	1,205	97.80	117,386	2,507	40,288	44,377
	102	254,345	11,376	265,721	39,689	31,667	3,526	94.10	254,722	15,760	86,006	53,768
Pittsburgh & West Virginia	89	205,961	7,342	213,303	21,121	7,048	3,088	92.70	192,354	15,801	102,460	87,019
	89	431,355	16,013	447,368	43,987	15,472	6,243	79.20	403,734	29,552	194,427	141,318
Pittsburgh, Shawmut & Northern	210	120,809	7,974	128,783	130,973	39,891	1,513	96.60	126,602	4,371	18,977	13,266
Quincy, Omaha & Kansas City	250	271,542	17,444	288,986	44,554	87,813	1,005	95.20	279,834	14,141	24,479	21,084
	250	62,376	17,040	79,416	16,554	19,677	1,165	129.40	111,744	29,060	36,310	33,960
	250	161,020	39,178	200,198	44,107	42,883	1,960	107.90	230,848	24,170	38,926	54,188
Richmond, Fred. & Potomac	117	374,635	342,088	716,723	87,691	60,488	8,145	71.20	624,554	211,381	138,140	132,999
	117	801,764	719,952	1,521,716	139,150	267,004	19,167	69.50	1,278,907	470,370	345,425	241,310
Rutland	413	274,927	107,458	382,385	78,318	87,841	7,542	94.30	431,689	11,390	33,856	16,025
	413	553,373	233,088	786,461	159,682	193,072	14,915	94.30	901,742	18,851	64,391	13,208
St. Louis-San Francisco	4,751	4,412,758	1,382,138	5,794,896	556,094	1,357,623	17,033	73.90	4,585,096	1,317,968	1,256,710	1,280,775
	4,751	9,160,952	2,983,864	12,144,816	1,668,120	2,649,062	176,033	72.70	9,446,504	2,982,946	2,826,144	2,527,538
Ft. Worth & Rio Grande	235	60,219	23,857	84,076	9,101	16,665	2,859	104.79	95,468	4,367	18,592	34,217
	235	144,848	49,757	194,605	39,501	48,507	5,980	99.91	210,008	1,900	27,972	58,777
St. Louis, San Fran. & Texas	134	85,940	13,522	99,462	105,055	27,859	3,895	104.10	109,361	6,373	30,103	11,082
	134	199,533	29,937	229,470	21,413	49,699	7,690	91.15	220,056	17,222	28,192	21,329
St. Louis-Southwestern	968	1,480,020	134,935	1,614,955	1,669,562	149,551	43,677	64.40	1,074,381	529,103	445,169	310,538
	968	3,207,463	289,114	3,496,577	3,616,550	381,409	88,361	63.10	2,860,688	1,194,486	1,006,968	641,284
St. Louis-Southw. of Texas	807	441,707	86,369	528,076	241,743	241,743	19,744	134.90	753,478	220,286	201,026	120,574
	807	1,020,889	180,034	1,200,923	265,725	523,021	40,163	127.20	1,620,984	397,088	392,909	212,993
San Antonio & Aransas Pass	739	274,149	57,985	332,134	81,715	119,361	17,018	113.40	412,769	69,741	49,064	45,002
	739	596,763	119,924	716,687	189,898	245,730	24,478	113.40	876,528	135,067	96,764	140,526
San Ant., Uvalde & Gulf	317	53,233	16,165	69,398	16,239	12,685	3,248	93.80	71,502	1,640	10,442	6,306
	317	108,273	34,067	142,340	26,500	25,824	7,371	89.60	140,936	16,328	17,357	17,887
Seaboard Air Line	3,576	3,145,213	1,005,954	4,151,167	4,542,476	468,020	143,382	77.40	3,544,481	1,027,995	851,964	557,501
	3,576	6,194,507	2,071,584	8,266,091	1,053,453	1,608,591	283,146	77.90	7,033,256	1,996,951	1,644,854	1,082,459
Southern	6,971	8,044,863	2,266,260	10,311,123	1,688,537	2,040,754	212,546	77.70	8,634,675	2,003,512	1,681,710	704,855
	6,971	16,547,336	4,264,824	20,812,160	3,244,087	4,342,379	432,083	77.40	17,027,605	4,334,782	3,878,140	1,411,051
Alabama Gr. Southern	318	636,450	137,691	774,141	98,733	160,175	21,092	75.50	200,996	133,076	134,775	72,733
	318	1,336,936	291,881	1,628,817	189,539	311,073	41,764	71.60	1,244,345	486,369	404,632	154,128
Cincin., N. O. & Texas Pacific	338	1,364,280	298,162	1,662,442	174,934	392,063	34,361	71.30	1,241,394	386,685	371,330	164,602
	338	2,775,294	683,441	3,458,735	399,867	810,513	65,376	70.80	2,559,200	880,094	836,709	431,121
Gal., Southern & Fla.	462	251,537	104,722	356,259	390,093	61,265	11,094	78.40	305,806	63,132	23,317	1,236
	462	517,566	238,436	755,992	127,267	127,686	24,166	77.30	639,907	144,910	66,033	46,064
New Orleans & Northeastern	207	407,104	70,730	477,834	53,748	99,335	11,845	77.10	414,612	71,278	56,880	2,201
	207	878,901	147,281	1,026,182	155,848	211,290	22,535	77.40	888,514	188,896	156,724	7,044
Northern Alabama	110	103,925	11,571	115,496	117,926	7,559	3,399	71.00	34,139	30,162	9,234	12,913
	110	238,489	24,204	262,693	26,703	44,137	6,371	60.60	162,296	97,450	55,205	11,095
Southern Pacific	7,116	8,625,676	3,233,794	11,859,470	2,095,620	2,667,161	295,493	78.20	10,354,164	1,600,776	1,544,529	658,519
	7,116	17,905,587	6,762,656	24,668,243	4,200,269	5,461,366	568,136	77.10	21,191,611	3,715,044	3,561,136	1,607,315
Arizona Eastern	382	233,743	29,893	263,636	279,103	42,959	2,966	80.80	169,653	83,062	73,269	34,827
	382	485,192	62,526	547,718	57,667	82,463	5,056	59.20	236,313	182,848	162,413	37,643
Atlantic S. S. Lines	...	966,966	60,284	1,027,250	1,078,638	127,308	16,234	80.30	866,299	200,757	200,367	219,708
	...	1,979,434	112,815	2,092,249	2,201,663	263,376	44,282	81.00	1,782,405	396,096	395,706	375,502
Calv., Harris, & San Ant.	1,379	1,199,174	390,097	1,589,271	1,676,989	352,062	43,188	90.80	1,541,411	91,770	50,702	206,447
	1,379	2,564,986	807,533	3,372,519	3,568,315	765,760	89,788	89.60	3,196,383	248,733	173,017	224,323
Houston & Tex. Central	923	679,105	233,011	912,116	975,807	251,737	26,824	99.30	968,672	7,135	80,651	127,588
	923	1,567,642	493,566	2,061,208	2,203,194	480,274	52,246	87.20	1,922,250	173,096	111,417	405,303
Houston E. & W. Texas	191	144,713	36,547	181,260	193,525	58,456	3,239	111.00	214,877	30,159	45,636	4,812
	191	334,824	78,531	413,355	437,816	118,090	6,755	99.10	433,672	13,330	40,885	44,341
Louisiana Western	207	220,382	83,976	304,358	326,272	62,909	19,196	70.30	225,530	171,800	161,844	116,574
	207	533,496	174,978	708,474	739,503	130,361	33,426	96.60	667,383	23,739	44,368	26,895
Morgan's La. & T. R. R. & S.	400	486,981	151,365	638,346	690,845	152,662	15,317	86.20	1,366,973	124,702	55,801	101,226
	400	1,151,397	318,698	1,469,095	1,585,869	340,681	32,204	104.00	1,654,095	54,142	75,081	38,721



## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY AND TWO MONTHS OF CALENDAR YEAR 1923—CONTINUED

Name of road	Average mileage operated during period	Operating revenues			Operating expenses			Operating ratio	Net fr. m. operation	Operating income (or loss)	Net rentals 1922	Net after rentals 1922
		Freight	Passenger	Total (inc. misc.)	Maintenance of way and structures	Traffic	Trans- portation					
Texas & New Orleans.....Feb.	507	\$436,510	\$148,739	\$585,249	\$183,357	\$13,672	\$255,369	\$104.00	\$75,081	\$54,142	\$38,721	\$38,721
.....2 mos.	507	980,403	299,374	1,279,777	387,031	27,694	552,101	99.30	9,702	47,762	167,534	167,534
Spokane International.....Feb.	165	73,714	12,931	86,645	11,047	3,261	41,718	79.80	18,347	12,610	5,560	5,560
.....2 mos.	165	152,922	25,157	178,079	20,563	6,405	82,144	73.90	50,226	38,660	24,963	18,837
Spokane, Portland & Seattle.....Feb.	551	364,780	113,700	478,480	46,761	8,629	174,863	68.20	170,016	94,898	81,917	81,917
.....2 mos.	551	799,478	240,635	1,040,113	109,398	18,245	366,095	66.70	384,200	233,890	200,966	132,820
Tennessee Central.....Feb.	287	187,747	35,079	222,826	30,216	5,451	94,844	74.20	60,526	55,502	34,921	26,740
.....2 mos.	287	373,733	75,818	449,551	59,854	11,494	193,776	76.50	111,523	101,454	55,970	—8,904
Term. R. R. Assn. of St. Louis.....Feb.	37	.....	.....	364,416	83,392	944	144,176	73.70	95,981	26,785	145,769	196,773
.....2 mos.	37	.....	.....	767,112	162,710	1,974	279,175	71.50	218,922	88,134	319,855	396,570
E. St. Louis Connecting.....Feb.	1	.....	.....	205,448	9,914	271	66,081	39.70	123,836	113,265	94,475	41,220
.....2 mos.	1	.....	.....	408,413	29,071	561	135,201	46.00	220,463	199,305	163,729	75,062
St. Louis, Mehta. Br. Term.....Feb.	9	.....	.....	410,297	42,259	858	195,831	65.90	140,038	113,261	111,782	106,640
.....2 mos.	9	.....	.....	766,074	111,202	1,796	403,751	69.90	260,639	207,029	193,988	195,215
St. Louis Transfer.....Feb.	6	.....	.....	148,288	5,109	157	39,357	63.40	27,847	27,579	20,563	48,455
.....2 mos.	6	.....	.....	296,576	10,218	316	78,713	68.30	46,973	46,427	32,936	94,980
Texas & Pacific.....Feb.	1,952	1,619,438	520,928	2,140,366	274,990	45,964	946,882	89.40	246,461	144,675	—21,568	134,553
.....2 mos.	1,952	3,278,045	1,134,525	4,412,570	541,417	90,801	1,893,765	89.60	529,418	325,182	—33,706	258,457
Toledo, Peoria & Western.....Feb.	247	98,411	43,060	141,471	23,055	2,273	78,659	101.00	—2,909	—13,913	—9,919	1,126
.....2 mos.	247	197,241	89,214	286,455	50,229	4,933	166,987	106.80	—20,813	—42,896	—32,868	—39,820
Toledo, St. Louis & Western.....Feb.	454	903,693	26,043	929,736	127,183	21,148	322,592	65.00	339,668	276,607	235,949	179,267
.....2 mos.	454	1,922,605	54,786	1,977,391	295,180	42,344	673,171	61.80	788,296	635,303	541,626	317,823
Trinity & Brazos Valley.....Feb.	368	106,066	16,382	122,448	23,311	3,220	56,187	112.20	—15,625	—33,207	—47,193	—18,037
.....2 mos.	368	247,285	33,060	280,345	75,469	7,820	137,734	103.90	—11,521	—26,615	—70,378	—25,618
Ulster & Delaware.....Feb.	128	46,085	21,058	67,143	14,991	1,682	54,888	101.70	—1,692	—7,693	—18,994	—18,994
.....2 mos.	128	95,080	42,898	137,978	28,133	3,418	112,353	104.10	—8,412	—20,418	—26,566	—47,580
Union.....Feb.	45	.....	.....	770,825	38,815	1,148	444,847	86.40	104,556	93,556	169,902	188,304
.....2 mos.	45	.....	.....	1,716,075	82,990	327	932,980	89.60	332,883	310,883	446,798	340,259
Union Pacific.....Feb.	3,708	5,748,271	1,070,527	6,818,798	1,763,353	119,612	2,367,078	69.90	2,257,017	1,695,308	1,825,281	1,560,886
.....2 mos.	3,708	11,995,316	2,351,560	14,346,876	3,897,868	243,304	5,170,388	71.80	4,438,930	3,311,666	3,435,329	2,619,950
Oreg. Short Line.....Feb.	2,366	2,085,673	349,126	2,434,799	306,005	44,778	923,199	77.20	600,350	347,026	339,551	420,943
.....2 mos.	2,366	4,582,731	738,976	5,321,707	625,256	83,599	2,019,373	75.40	1,402,545	897,140	877,914	749,269
Oreg.-Wash. R. R. & Nav.....Feb.	2,237	1,374,479	376,343	1,750,822	323,364	53,732	999,533	100.70	—12,627	—179,304	—248,348	—122,310
.....2 mos.	2,237	3,134,665	801,925	3,936,590	671,537	113,769	2,201,944	97.70	121,673	—21,539	—348,522	—219,311
St. Joseph & Grand Isl.....Feb.	258	205,327	20,376	225,703	23,043	2,304	120,534	84.20	37,720	24,570	4,276	16,885
.....2 mos.	258	431,150	44,548	475,698	44,140	4,769	245,080	85.30	74,310	47,918	21,398	26,592
Utah.....Feb.	102	126,133	676	126,809	15,123	382	37,468	73.30	34,116	26,973	23,021	35,728
.....2 mos.	102	274,418	1,508	275,926	29,568	714	78,374	72.90	75,203	60,916	49,308	42,618
Virginian.....Feb.	540	1,356,079	64,069	1,420,148	365,541	10,462	456,639	67.60	489,497	390,131	435,668	554,835
.....2 mos.	540	2,802,254	134,833	2,937,087	735,611	22,561	935,988	68.00	997,870	781,736	880,618	973,499
Wabash.....Feb.	2,472	3,651,175	573,729	4,224,904	555,050	109,805	1,973,024	82.70	797,169	606,865	306,686	401,241
.....2 mos.	2,472	7,507,850	1,261,771	8,769,621	1,185,404	223,004	4,030,818	83.30	1,581,477	1,200,660	639,240	471,291
Western Maryland.....Feb.	804	1,545,200	63,741	1,608,941	178,313	33,158	440,636	79.50	349,902	279,902	335,971	268,167
.....2 mos.	804	3,091,538	138,928	3,230,466	352,220	68,208	1,315,151	79.70	696,585	566,585	635,087	532,572
Western Pacific.....Feb.	1,043	641,890	101,981	743,871	188,231	31,911	330,517	90.20	78,148	2,023	73,765	—57,238
.....2 mos.	1,043	1,341,498	200,901	1,542,399	299,084	66,643	717,183	90.90	150,666	—1,251	150,960	7,846
Wheeling & Lake Erie.....Feb.	511	895,655	52,179	947,834	96,829	14,675	417,728	90.60	98,140	—457	5,437	140,731
.....2 mos.	511	1,836,948	112,799	1,949,747	799,921	28,030	864,811	91.10	189,285	—7,317	—68,216	—101,835
Notes—												
Combined report of Ill. Cent., Y. & Miss. Val.....Feb.	6,219	11,608,802	2,293,531	13,902,333	1,819,356	5,872,279	3,421,145	78.00	3,240,113	2,311,386	2,306,061	2,245,914
*Evansville, Ind. & Terre Haute.....Feb.	140	124,663	6,261	130,924	27,284	1,212	62,076	77.00	71,941,105	5,224,077	5,185,594	3,834,499
.....2 mos.	140	271,629	14,586	286,215	58,383	3,144	127,439	74.00	35,620	31,387	—4,900	—44,945
.....2 mos.	140	271,629	14,586	286,215	58,383	3,144	127,439	72.20	83,226	74,760	—665	—75,705

\*This report is the first filed by this road as a first class road.

### Prospective Traffic in the Northwest

An estimate of the number of cars required to move traffic in the next three months made by the Northwest Regional Advisory Board of the American Railway Association is 20 per cent more than in the corresponding month of last year. A report of the miscellaneous traffic committee shows that an increase over the corresponding month of 1922 in agricultural implements will be 50 per cent, threshing machines 25 per cent, tractors 50 per cent, iron and steel structures 200 per cent, grading machinery 30 per cent, machinery 25 per cent, beverages 25 per cent, printing paper 25 per cent, butter 25 per cent and automobiles 100 per cent. The Lumber Committee estimated requirements of the mills in the Northwest as 20,000 cars. The Grain Committee report shows there are 101,125 cars of grain to be shipped in four Northwest States, while there are 45,271 cars of grain in country elevators and enough to fill 55,854 cars on the farms.

### Executives Asked to Suggest

#### Solution for Orient Problem

The Association of Railway Executives has been asked by the Interstate Commerce Commission to interest itself in the problem of finding some method of relief for the Kansas City, Mexico & Orient and other similarly situated roads which are regarded as too essential to the people in the territory they serve to be abandoned. At the request of Chairman Meyer, a committee representing the association went to Washington on April 7 and held a general conference on the subject with Chairman Meyer and Commissioner Eastman, of Division 4. Some suggestions were made by the commissioners as to the feasibility of according the Orient a differential in rates which would attract business to its line and increase its earnings. An order of the commission directing its connecting lines to increase the Orient's divisions has been enjoined.

### Locomotive Shipments Largest Since 1920

Shipments of railroad locomotives from the principal manufacturing plants increased to 282 in March, and were the highest since December, 1920, according to figures published by the Department of Commerce from compilations of the Bureau of Census. Unfilled orders continued to increase and made a new high record at 2,316 locomotives, an increase of 96 during the month. Unfilled foreign orders increased for the first time since last October.

The following table compares the March, 1923, figures with the previous month and with the corresponding month last year, as well as totals for the year to date, compared with a year ago, in number of locomotives:

	LOCOMOTIVES		March 1922	Three months' total January March	
	March 1923	Feb. 1923		1923	1922
Shipments:					
Domestic .....	269	196	35	682	86
Foreign .....	13	11	4	36	71
Total .....	282	207	39	718	157
Unfilled orders:					
Domestic .....	2,214	2,141	255	...	...
Foreign .....	102	79	75	...	...
Total .....	2,316	2,220	330	...	...

### "N. C. Law Stop"

The Legislature of North Carolina has passed a law, to go into effect on July 1, requiring drivers of motor vehicles to come to a stop, within 50 ft., before crossing a railroad track of either a standard or an interurban line, except in the case of electric railways in towns, and except at crossings where there is a gate or a watchman. Signs are to be set up at crossings, lettered as quoted in the heading of this paragraph. The railroad company must in each case provide the sign, which is to be not less than 10 ft. high, on the right side of the road, and 40 in. by 50 in. in size; to be set 100 ft. from the crossing and be painted with red lettering. Section 2 provides that the act shall not interfere with the regulations prescribed by towns and cities. The maximum penalty for violation of the act is \$10 fine or 10 days' imprisonment or both. The requirement of the law is absolute, but there is a clause to the effect that failure to make the stop shall not be

considered contributory negligence *per se*; but in an action against a railroad the facts relating to such failure may be considered, along with other facts.

### Philadelphia & Reading Completes

#### Ninety Years of Service

The Philadelphia & Reading on April 4 celebrated its ninetieth anniversary. In connection with this celebration, Agnew T. Dice, president, wrote the following letter, which was handed to every employee of the system:

"My Fellow Workers:

"Chartered April 4, 1833, to build a railroad from Reading to Philadelphia, a distance of 58 miles (primarily for the transportation of coal), year by year we have continued to grow until now, with 3,796 miles of track, 1,107 locomotives, 1,096 passenger cars, 42,000 freight cars and a railroad family of 29,641 employees, the Reading System has taken its place as one of the greatest railroads in the world, and now ranks fourth in the railroads of the United States in the amount of tonnage carried over its lines.

"With profound respect for the achievements of our predecessors, whose foresight and perseverance made this great institution possible, I am very proud indeed, as your president, of the accomplishments, of the intelligence, and of the loyalty of this great body of railroad workers that is making transportation history.

"Surely a continuance of this confidence, loyalty and co-operation and our united, earnest effort to serve the public every day will bring its rich reward of good will and business, as it has in the past.

"May this be a happy birthday throughout the Reading System and may we all be spared to celebrate our hundredth anniversary."

### Three Thousand Careless Drivers

Details of grade crossing accidents which often constitute dull reading because of their familiarity, yet still are necessary because of the grave lessons which they contain, have again been published by the Pennsylvania Railroad; and the memorandum is of more than usual interest because of the large number of cases studied and the careful comments which accompany them.

Referring particularly to the "careful crossing campaign" of last Summer, it is reported that observations were made of more than 100,000 automobiles while actually crossing the tracks; and it is believed that in 97 per cent of these cases the drivers were reasonably careful. There are 12,000 grade crossings on the Pennsylvania lines; and in the four months of the campaign, 682 accidents were recorded on this road, involving the death of 71 persons and injuries to 131. Sixty per cent of the trains were moving at less than 20 miles an hour. Motor trucks were involved in these accidents much more frequently, in proportion to the number of trucks in use, than were automobiles.

Seven persons were killed and 17 injured when the cause was the attempt to beat a train to the crossing; 14 killed and 7 injured while automatic crossing bells were ringing; 5 killed and 22 injured when the signal of a watchman was disregarded. Three killed and 3 injured due to intoxication of drivers. Without doubt, a portion of the other accidents where the victim was himself to blame were due to liquor drinking. There were 280 cases of automobiles breaking through gates but without striking trains; in 70 cases, trains were actually run into; resulting in 14 persons being killed and 22 injured.

### Consolidated Equipment Repairs

#### for Short Line Association

Negotiations have been concluded through the efforts of J. W. Cain, manager of the purchases of the American Short Line Railroad Association, between the association's banking interests and the Midwest Engine Corporation of Indianapolis, Ind., covering an extensive re-building program for used locomotives and freight cars. The program will call for the general overhauling of 108 locomotives and the re-building of 3,600 freight cars each year for the next five years. The plan is an outcome of the investigation of the feasibility of building several thousand cars of standard design which could be financed on a consolidated basis and allocated to the individual lines of the American Short Line Railroad Association.



The freight cars will be financed on a basis of approximately 25 per cent cash and the balance by car trust notes extending over five years. Locomotives will require one-third cash and the balance will extend from one to two years. When the requirements of a road are not sufficient to justify the economical handling of an individual issue a grouping will be made and the total equipment will be covered by one general trust agreement. Equipment will be rebuilt in a manner satisfactory to the banking syndicate as suitable collateral.

Where conditions warrant freight cars are to be rebuilt with steel center sills or draft arms, friction draft gear, outside metal roofs and other specialties. Locomotives will be superheated or otherwise equipped with fuel saving devices. Parts of the plant of the Midwest Engine Corporation will be devoted to freight car and locomotive repairing. The freight car repairing is expected to start within 60 days. Locomotive repairing will start July 1. H. C. May, formerly superintendent of motive power of the Monon and the Lehigh Valley, has been elected president of the new company. A. J. Canfield, formerly of the Canadian Car & Foundry Company, will be in charge of the car department. Ferdinand Barnickol, president of the Indianapolis Drop Forging Company, has been elected chairman of the board of directors, other directors are A. Rosenthal, H. C. Purdy, L. M. Rappaport and J. Wood.

### Wage Statistics for January

The number of employees reported by Class I roads for the month of January, 1923, was 1,779,516, a decrease of 9,074, or 0.5 per cent, as compared with the returns for December, 1922, according to the Interstate Commerce Commission's monthly summary of wage statistics. The total compensation was \$250,051,786, an increase of \$2,379,271, or 1 per cent. This increase, in spite of the decrease in employment, is explained by the fact that January had 26 working days while December had only 25. The employment in the maintenance of equipment group shows an increase in January as compared with December. The overtime payments to employees in this group continue heavy, being 10.87 per cent of their total compensation. In the same month last year this percentage was 3.53.

Compared with the previous month, the increase or decrease (D) in the number of employees, by groups, was as follows:

Executives, officials, and staff assistants.....	81
Professional, clerical, and general.....	D 1,149
Maintenance of way and structures.....	D 9,889
Maintenance of equipment and stores.....	6,074
Transportation (other than train, engine, and yard).....	D 4,783
Transportation (yardmasters, switch tenders, and hostlers).....	281
Transportation (train and engine service).....	311
Net decrease .....	D 9,074

A comparison of the number of employees and their compensation, by months, follows:

Month	Number of employees	Total compensation
January, 1922*	1,552,014	\$205,178,639
February, 1922*	1,545,040	194,523,427
March, 1922*	1,570,158	216,704,408
April, 1922	1,578,133	203,413,071
May, 1922	1,628,228	216,672,028
June, 1922	1,685,414	222,932,689
July, 1922	1,467,824	193,571,244
August, 1922	1,594,074	224,976,644
September, 1922	1,708,591	238,735,394
October, 1922	1,804,315	255,514,000
November, 1922	1,820,463	249,286,713
December, 1922	1,788,590	247,672,515
January	1,779,516	250,051,786

\* Excludes Detroit, Toledo & Ironton Railroad.

### Business Paper Editors Advocate

#### Heavier Car Loading

The following resolution was adopted at the recent meeting of the National Conference of Business Paper Editors:

"The National Conference of Business Paper Editors, at a meeting held at Middletown, Ohio, on March 26 and 27, made a survey of the present and prospective industrial activities of our nation which demonstrated that we are now passing through a period of active trade expansion of widespread scope. This condition is making increased demands for transportation, which demands will be accentuated still further by the heavy road building and other seasonal construction activities. There is now and has been for several months a shortage of transportation facilities and all indications point to this condition becoming more pronounced,

threatening to become the most acute shortage ever experienced.

"The inability of the railways to meet the demands for the transportation of the raw products into our factories and the finished products out will restrict the output of these industries. The inability of the consumer to secure deliveries will interfere seriously with business expansion and will result in a further inflation in prices.

"The railways are endeavoring to meet this crisis by record breaking orders for additional equipment and the car and locomotive building plants are booked to capacity for months to come. Further relief can be secured only by using more intensively the equipment we now have. This involves the loading of cars more nearly to their capacity. At the present time the average loading is only approximately half of the average capacity of the cars now in service. Furthermore, each ton that this average loading is increased is equivalent to the adding of 100,000 cars to the number in service. The members of the National Conference of Business Paper Editors can do much to increase the loading of cars by the industries served by their publications by the presentation of these facts through their columns and we urge that each editor assume a personal responsibility for the mutual benefit of all industries."

### U. S. Chamber of Commerce Transportation Study

Progress reports on the transportation study being made under the auspices of the Chamber of Commerce of the United States through the medium of a Transportation Conference are expected to be presented during the eleventh annual meeting of the National Chamber in New York, May 7-10.

Five special committees, representative of all interests in transportation, to which the elements of the problem have been assigned for accumulation of data and preliminary study, are already at work. They will report to a general committee, to be named later by President Julius H. Barnes, of the National Chamber. Action by the general committee to weld the reports into definite recommendations for a national transportation policy will not be taken prior to the annual meeting of the National Chamber, however, and discussion at the transportation group session in New York will have to do with the progress then made by the special committees.

Arrangements for the Transportation Conference and also for the transportation group program at the New York meeting are in the hands of A. B. Barber, manager of the Department of Transportation and Communication of the National Chamber. As now planned, the program of the group meetings will merge into the work of the conference's special committees. At these meetings in New York there will be afforded opportunity for discussion among transportation men of such aspects of the problems as the special committees have developed by that time.

The meetings of the railway consolidations committee in Washington were indicative of the importance attached to the effort to bring out constructive business views of transportation generally. In addition to the railroad executives, who bring to the committee's deliberations intimate knowledge of the railroad business, the committee membership has been constituted to the end that recommendations shall represent the consensus of thought of American business life on the consolidation question. After considering the advantages to shippers and to the general public to be expected from consolidation of American railways into a limited number of great, competitive systems, the committee is proceeding with the study of the various phases of the subject supplementary to the official plan of consolidation now being worked out by the Interstate Commerce Commission as provided for in the Transportation Act.

The other four special committees of the Transportation Conference have been formed in the same way. Preliminary reports on their work to be made at the New York meeting should afford a clear view of the trend the study is taking in its preliminary stages and the discussions of the transportation group may prove timely in aiding the committee members to reach their final determination for submission to the general committee of the Transportation Conference.

General sessions of the National Chamber's annual meeting in New York will also be devoted largely to transportation. The program in preparation contemplates addresses on all aspects of the subject by men recognized as national authorities on the questions assigned to them. The general meetings will follow rather

set programs, however, and there will be little chance for informal discussion except on resolutions. For that reason the transportation group meeting, to be held May 9 in the roof garden of the Waldorf-Astoria, promises to furnish the earliest opportunity for a detailed picture of the progress of the transportation inquiry.

### Annual Meeting of the Safety Section of the A. R. A.

The Safety Section of the American Railway Association will hold its third annual meeting at the Statler Hotel, St. Louis, Mo., on April 24-26. The program for this meeting is as follows:

#### TUESDAY, April 24.

Opening business and reports of officers.

The Safety Section, by John G. Walber, vice-president in charge of personnel, N. Y. C.

Report of Committee on Prevention of Highway Crossing Accidents.

#### Discussion—

- (a) Physical Characteristics, by F. H. Babcock, safety agent, P. & L. E.
- (b) Rule 14-L and other Rules, by F. W. Mitchell, director of personnel, N. Y., N. H. & H.
- (c) Posters, Brochures and Other Printed Matter by L. P. Green, superintendent of safety, M., St. P. & S. S. M.
- (d) Films and Slides, by R. C. Richards, chairman, safety committee, C. & N. W.
- (e) Miscellaneous Publicity Devices, by S. G. Watkins, general secretary, Safety First Organization, B. & M.
- (f) Newspaper and Magazine Publicity, by T. P. Brennan, supervisor of safety, L. I.
- (g) Co-operation with other Organizations and Agencies, by Charles E. Hill, general safety agent, N. Y. C.
- (h) The Printers' Task, by Robert Scott, superintendent insurance and safety, A. C. L.
- (i) Physical and Mental Qualifications of Crossing Watchmen, by E. M. Switzer, superintendent of safety, C. B. & Q.

#### WEDNESDAY, April 25.

Report of Committee on Publicity and Education.

#### Discussion—

- (a) Photographs and Bulletins, by A. V. Rohweder, supervisor of safety, D. M. & N.
  - (b) Newspapers and Magazines, by L. P. Green, superintendent of safety, M., St. P. & S. S. M.
  - (c) Radio, by J. G. Fitzhugh, safety supervisor, G. C. & S. F.
  - (d) Public Schools, by L. G. Bentley, general safety agent, C. & O.
  - (e) Instruction of New Men Before They Are Put to Work, by G. L. Wright, superintendent safety bureau, C., St. P., M. & O.
  - (f) Moving Pictures, by R. C. Richards, chairman, general safety committee, C. & N. W.
  - (g) National Safety Council, by A. T. Morey, general manager, Commonwealth Steel Company.
- One Angle of Safety, by H. M. Mayo, superintendent of safety, S. P.
- Safety Rules and Instructions, by Fred M. Metcalf, assistant to general manager, N. P.

#### Discussion—

- (a) Motive Power Department Safety Rules, by D. G. Phillips, superintendent safety, Wabash.
  - (b) Operating Department Safety Rules, by E. R. Scoville, assistant superintendent safety department, B. & O.
  - (c) Maintenance of Way Safety Rules, by S. S. Morris, chairman, general safety committee, I. C.
- Safety Committees, by H. A. Adams, assistant to general manager, U. P.

#### Discussion—

#### THURSDAY, April 26.

Report of Committee on Statistics.

Train Accidents, by F. Hartenstien, assistant to general manager, L. V.

#### Discussion—

- (a) Negligence of Employees, by J. B. Monahan, supervisor of safety, S. P.
- (b) Defects in or Failure of Equipment (speaker to be announced).
- (c) Defects in or Improper Maintenance of Way and Structures, by E. E. Stroup, division superintendent, C. G. W.

#### Train Service Accidents—

- (a) Coupling and uncoupling, by W. D. Lenderking, safety agent, B. & O.
- (b) Operating Locomotives, by E. M. Harris, safety agent, N. Y., N. H. & H.
- (c) Operating Hand-brakes and Hand Switches, by D. E. Satterfield, safety inspector, C. & O.
- (d) Coming in Contact with Fixed Structures, by Mr. Smith, safety agent, M., K. & T.
- (e) Getting on or off Engines or Cars; Falling from Engines or Cars; Struck or Run Over by Engines or Cars; by C. W. Hammond, safety agent, N. Y. C. R. R.

#### Non-Train Accidents—

- (a) Explosives and Inflammables, by J. T. Pratt, supervisor of safety, P. & R.
- (b) Hand Car and Motor Car Accidents, by F. B. Thomas, safety inspector, C. B. & Q.
- (c) Plant Maintenance, by E. S. Chapin, safety inspector, insurance department, Penna.
- (d) Working Machinery; Use of Hand Tools; Burns; Scalds and Punctures; by C. T. Bailey, chief safety agent, O. S. L.
- (e) Electric Currents, Falls of Objects or Persons, by J. J. Crowley, chief electrician, C., M. & St. P.
- (f) Handling Rails, Ties, Timber, etc., by L. F. Shedd, general supervisor of safety and fire prevention, C. R. I. & P.
- (g) Handling Freight, Supplies, Material, etc. (speaker to be announced).

## Traffic News

The Nevada-California-Oregon has applied to the California Railroad Commission for a certificate to operate an auto stage line between Alturas, Cal., and Eagleville, in conjunction with its rail line.

B. H. Harris, general manager of the Chicago Steamship Lines, Inc., with headquarters at Chicago, has been appointed traffic manager of the Marquette Cement Manufacturing Company, with the same headquarters.

The Minneapolis, St. Paul & Sault Ste. Marie will establish on June 10 a new train to be known as the Mountaineer, which will leave Chicago daily at 9:45 p. m. and run to Vancouver, B. C., by the way of St. Paul, Minneapolis, and the Canadian Pacific.

The Interstate Commerce Commission has amended its order requiring the sale of interchangeable scrip coupon books by eliminating from the list of roads the Pittsburgh & West Virginia, the Lake Superior & Ishpeming and the Staten Island Rapid Transit.

The Missouri legislature has passed a bill which requires railroads to supply stock cars within 96 hours after application. It provides a penalty of \$15 a day and reimbursement for all damages suffered because of the failure to obtain cars. A fine of \$1,000 to \$5,000 a day is provided for failure to comply with second or later requests.

"In the Maine Woods" is the title of a summer (and winter) resort pamphlet which has been issued by the passenger department of the Bangor & Aroostook Railroad. It is a profusely illustrated guide book of 100 pages, supplemented by 60 pages of advertising for good measure. The photographic views are excellent examples of tasteful work, and numerous large scale maps make the geography easy to comprehend.

The Chicago, Burlington & Quincy, the Great Northern and the Northern Pacific, in their campaign to advertise the Pacific northwest, have issued a booklet discussing the Pacific northwest as a whole, with brief statements regarding its principal industries and resources. The book is the first of a series to be issued and will be followed by publications which will deal separately and in detail with each phase of the subject presented in the first booklet.

The Georgia Public Service Commission has been called upon to show cause in the United States District Court, on April 21, why the commission should not be enjoined from enforcing the freight rate rule recently issued, requiring the Southern Railway and the Georgia Southern & Florida Railway to make through rates as though they were a single company. Freight rates in Georgia are based primarily on distance, but where a route is over two or more companies, the rate may be higher than over a single line; and this order has been issued on the ground that the two roads named are owned substantially by the same interests. The roads petitioned the court to make this inquiry on the ground that they are separate corporations and that the proposed order would result in a loss to each of them of \$12,000 a year.

### Ton Mileage in January Almost 23 Billions

The ton miles of revenue freight traffic handled by the Class I railroads during January totaled 33,941,844,000, according to the Interstate Commerce Commission's monthly summary of traffic statistics. The figures cover 177 steam roads, not including switching and terminal companies. This compares with a total of 23,741,680,000 in January, 1922, and represents an increase of 44 per cent. The freight revenue was \$366,039,762, as compared with \$276,527,265, or an increase of 33 per cent. The average revenue per ton mile was 1.078 cents, as compared with 1.165 in January last year. The number of passengers carried one mile also showed an increase to 2,933,269,000, as compared with 2,708,943,000 in January last year. The average revenue per passenger mile was 3.104 cents, as compared with 3.096.



## Commission and Court News

### Interstate Commerce Commission

The commission has dismissed its proceeding involving the routing of traffic over the lines of the Kansas City, Mexico & Orient and the Kansas City, Mexico & Orient of Texas.

The commission has ordered an investigation into the adequacy of transportation facilities in the Northwest Pacific states for the purpose of complying with a Senate resolution passed on January 20, directing the commission to report on this subject.

The commission has denied the petitions for reargument and reconsideration of its decision requiring the railroads to issue interchangeable scrip coupon tickets at a reduction of 20 per cent, filed by the American Farm Bureau Federation and the western, southwestern and transcontinental carriers and the Baltimore & Ohio.

The commission has ordered an investigation into the passenger fares required by the Alabama Public Service Commission to be maintained for intrastate traffic. The railroads of Alabama filed a petition complaining of the state commission's order of July 11, 1922, requiring them to charge no more than 3 cents a mile for passengers and to sell mileage books for 1,000 miles at \$25.

The adequacy of transportation facilities in the Pacific north-western states is to be the subject of a general investigation by the Interstate Commerce Commission in response to a resolution passed by the Senate on January 20. The commission proposes to ascertain to what extent the railroads failed during the crop season of 1922 to supply an adequate number of cars and other transportation facilities to this territory for the movement of apples and other perishable crops, and for lumber and other products during the summer and fall of 1922, with a view to prescribing all suitable remedies.

The commission has issued a decision on the complaint of the Boston Wool Trade Association, in which it finds that the proportional rates from New York to Boston on wool, camel's hair and mohair, in the grease and scoured, received by steamship at New York from points in the United States, are not unreasonable or otherwise unlawful, except that rates on camel's hair prior to August 1, 1921, are found unreasonable to the extent indicated. Rates between New York and Boston applicable on the same commodities exported and imported to and from South America, Mexico and the West Indies are not found unreasonable or otherwise unlawful.

Complaints of the Illinois Coal Traffic Bureau and others attacking freight rates on coal will be expedited by the Interstate Commerce Commission at the request of the United States Coal Commission. Hearings will begin on May 2, and the cases will be finally argued before the commission on June 14. The Northwestern Coal Dock Operators' Association, the Sioux City Chamber of Commerce, the South Dakota Board of Railroad Commissioners and the C. Reiss Coal Company have filed complaints. The Illinois Bureau's complaint alleges that the rates on bituminous coal from Milwaukee and from northern Illinois to points in Wisconsin are prejudicial to northern Illinois operators.

The Commission, in the case of the Southeastern Express Company vs. the American Railway Express Company, has prescribed through routes and joint rates between points on the lines of the Southeastern company and the American. The report says that Paragraph 4 of Section 15 of the interstate commerce act, providing that the commission shall not require any carrier by railroad, without its consent, to embrace in a through route substantially less than the entire length of its railroad, is not applicable to express companies. The report also recognizes and defines the shippers' right to designate the routing of express traffic over established routes.

## Equipment and Supplies

### Locomotives

THE GULF, MOBILE & NORTHERN is inquiring for 5 locomotives.

THE KANSAS CITY SOUTHERN is inquiring for 10, 2-8-2 Mallet type locomotives.

THE LEHIGH VALLEY contemplates coming in the market for from 25 to 30 Mikado type locomotives.

THE CHESTNUT RIDGE RAILWAY has ordered one Mogul type locomotive from the Baldwin Locomotive Works.

THE FLORIDA EAST COAST is inquiring for 15 Pacific type locomotives and five, 0-6-0 switching type locomotives.

THE DEER ISLAND LOGGING COMPANY, Oregon, has ordered one Prairie type locomotive from the Baldwin Locomotive Works.

THE SIMPSON LOGGING COMPANY, Shelton, Wash., has ordered one Mikado type locomotive from the Baldwin Locomotive Works.

THE NEW YORK CENTRAL has ordered for the Boston & Albany eight, 8-wheel switching locomotives from the Lima Locomotive Works.

THE OREGON AMERICAN LUMBER COMPANY, Vernonia, Ore., has ordered one Prairie type locomotive from the Baldwin Locomotive Works.

### Freight Cars

THE ANN ARBOR is inquiring for 500 automobile cars of 40 tons' capacity.

THE LOUISIANA & ARKANSAS has ordered 20 ballast cars from the American Car & Foundry Company.

THE NITRATE RAILWAYS OF CHILE are inquiring for 300 flat cars of 35, 40 or 45 metric tons capacity.

THE HURLEY GASOLINE COMPANY, Oklahoma, has ordered 5 insulated tank cars of 8,050 gal. capacity from the Pennsylvania Tank Car Company.

THE ROXANA PETROLEUM CORPORATION, St. Louis, Mo., has ordered 359 tank cars of 10,000 gal. capacity from the Standard Tank Car Company.

THE NEW ENGLAND OIL REFINING COMPANY, Boston, Mass., is having 250 tank cars built in the shops of the General American Tank Car Corporation.

THE SAND SPRINGS RAILWAY COMPANY, Sand Springs, Okla., has ordered six 8,000 gal. tank cars from the General American Tank Car Corporation.

THE SINCLAIR REFINING COMPANY, Chicago, is inquiring for 5 tank cars of 6,000 gal. capacity with two compartments, also for 10 tank cars of 8,000 gal. capacity with three compartments.

THE NEW YORK CENTRAL has ordered 2,000 refrigerator cars for the Michigan Central from the Merchants Dispatch Transportation Company. In the *Railway Age* of March 24 mention was made that 1,500 of these cars were under construction in the shops of the Merchants Dispatch.

THE CHESAPEAKE & OHIO, reported in the *Railway Age* of March 24 as having ordered 1,000, 70-ton hopper cars from the American Car & Foundry Company and 1,000 from the Standard Steel Car Company, has increased its order 1,000 cars to each company, making a total of 4,000 cars ordered recently.

### Passenger Cars

THE ATCHISON, TOPEKA & SANTA FE is inquiring for 25 baggage cars, 70-ft. long.

THE ILLINOIS CENTRAL is inquiring for 25, 60-ft. 6 in. steel suburban coaches.

THE NEW YORK CENTRAL has ordered 6 all steel baggage cars, to be 60-ft. 6 in. long, from the American Car & Foundry Company.

THE DELAWARE, LACKAWANNA & WESTERN, reported in the *Railway Age* of March 10 as inquiring for 10 milk cars, has ordered this equipment from the Standard Steel Car Company.

## Iron and Steel

THE CHICAGO, ROCK ISLAND & PACIFIC has ordered 350 tons of structural steel for turntables from the American Bridge Company.

THE TOLEDO TERMINAL RAILWAY has ordered 300 tons of structural steel for use at Toledo, Ohio, from the American Bridge Company.

THE NORFOLK & WESTERN will receive bids until 12 o'clock noon April 18 at Roanoke, Va., for 2,000 tons of steel bars, shapes and plates for delivery during the fourth quarter of 1923.

THE CHICAGO & EASTERN ILLINOIS has ordered 700 tons of structural steel in the form of deck and through plate girder spans, a through riveted truss span and I-beam spans from the American Bridge Company.

THE INTERNATIONAL & GREAT NORTHERN has ordered 175 tons of structural steel consisting of two, 100-ft. and one, 50-ft. deck plate girders for a bridge over the Guadalupe river near Braunsfels, Tex., from the Wisconsin Bridge Company.

## Machinery and Tools

THE PENNSYLVANIA has ordered equipment for three flue shops from Joseph T. Ryerson & Son, Inc.

THE MAINE CENTRAL has ordered one, 200-ton locomotive hoist for use at Portland, Me., from the Whiting Corporation.

THE PENNSYLVANIA has recently purchased from the Westinghouse Electric & Manufacturing Company a 20,000 kv-a, turbine generator complete with condensers, auxiliaries, and switching equipment for installation in its Long Island City power house, which supplies power to the Pennsylvania tunnel and terminal electrification at New York. This is the fourth unit of this capacity that the Pennsylvania has purchased from the Westinghouse Company for this power house.

## Miscellaneous

THE GREAT NORTHERN is inquiring for 790 tons structural steel ore spouts including bails and pins, also for 1,450 tons structural steel door frames, doors, door chutes, track stringers, hoist supports, walk supports, railings, etc.

THE CHICAGO & NORTHWESTERN, the pioneer railroad in the safety first movement, is now able to look back on a remarkable record covering 12 years and 6 months. The Central Safety Committee, R. C. Richards, chairman, in its fifty-third bulletin, just issued, shows that, for the period named, as compared with 12½ years prior to June 30, 1910, there has been a decrease of 41 per cent in the number of employees killed; 12½ per cent in the number of passengers killed and 28 per cent in the number of outsiders killed; and similar reductions have been made in the numbers injured. The percentages are based on tables showing 1,391 fewer deaths and 33,177 fewer injuries. The comparison by percentages is more than fair, as in the later period the number of employees and the volume of business were much larger than in the earlier. There are now about 1,200 men serving on the different safety committees; and during the years 1912-1922, these committees have made 64,827 recommendations for the elimination of dangerous conditions and practices.

## Supply Trade News

The Indianapolis Steel Products Company will construct a one-story plant, 100 ft. by 200 ft. at Palestine, Ind., to cost approximately \$100,000.

S. W. Hall, chief material inspector of the New York Central with headquarters at Cleveland, Ohio, has resigned to become a representative of the railroad department of the Wolf Brush Company, with headquarters at Chicago.

The Inland Steel Company is preparing plans for the enlargement of its No. 2 plant at Indiana Harbor, Ind., which will include four additional open hearth furnaces, which will increase the steel making capacity approximately 25 per cent.

W. O. Ashe, assistant engineer in the equipment engineering department of the New York Central with headquarters at New York, has been appointed mechanical engineer of the Commonwealth Steel Company with headquarters at St. Louis, Mo.

Dwight P. Robinson & Company, Inc., New York, engineers and constructors, has opened a new office in Philadelphia, Pa., under the direction of Carl A. Baer, who was recently with the firm of Baer, Cook & Company, engineers, and a consulting engineer in the design of industrial, textile and power plants.

Howard E. Boardman, for the past seven years engineering assistant to the general valuation counsel of the New York Central lines at New York, resigned on March 31 to become president and treasurer of Foster, Merriam & Company, Meriden, Conn. The latter firm is an old established manufacturer of cabinet hardware.

The Combustion Engineering Corporation, Ltd., New York, and the Uehling Instrument Company, Paterson, N. J., have recently entered into an agreement whereby Uehling interests in the Dominion of Canada and Newfoundland will be handled exclusively by the Combustion Engineering Corporation, Ltd., with offices in Toronto, Montreal, Winnipeg and Vancouver.

The Equipment Specialties Company, Chicago, has been organized to manufacture and sell railway car specialties. The company will be located at 166 West Jackson boulevard, Chicago. The officers of the company are: L. L. Cohen, president; George A. Hull, vice-president; W. R. Gillies, secretary; and C. Mosier, treasurer. The company will be under the active management of Mr. Hull.

Robert F. Eissler for the past two years assistant to the vice-president of the Chicago Pneumatic Tool Company, New York, has been appointed district manager at Pittsburgh. Nelson B. Gatch, district manager at New York, has been appointed assistant to vice-president with headquarters at New York, succeeding Mr. Eissler and William C. Straub has been appointed district manager at New York, to succeed Mr. Gatch.

The Certain-teed Products Corporation, St. Louis, Mo., manufacturer of prepared roofing, is offering \$8,000,000 first mortgage 6½% serial coupon bonds to finance the purchase of the plants and properties of Cook's Linoleum Company, and Standard Inlaid Manufacturing Company, both of Trenton, N. J., and Acme Cement Plaster Company, St. Louis, Mo., also to retire outstanding purchase money obligations issued in 1920.

## General Electric Company

The General Electric Company reports profit available for dividends in 1922 of \$26,231,019 as compared with \$21,652,812 in 1921. Net sales billed last year amounted to \$200,194,294 against \$221,007,992 in the previous year. Unfilled orders at the end of the year were \$76,220,000 compared with \$45,391,000 at the end of 1921.



The condensed balance sheet shows total assets of \$355,445,492. Cash on hand amounted to \$49,482,770 against \$39,888,683 at the close of 1921; inventories were carried at \$75,334,562 compared with \$64,848,189; notes and accounts receivable, \$35,154,419 compared with \$52,514,902. Accounts payable totaled \$14,351,633 against \$9,495,261. Employees' subscriptions to company securities in 1922 amounted to \$4,713,776 compared with \$2,043,770 in 1921. A reserve for pensions of \$2,000,000 and the sum of \$400,000 set aside for the Charles A. Coffin foundation are shown on the 1922 balance sheet.

The condensed profit and loss account follows:

	1922	1921
Net sales billed.....	\$200,194,294	\$221,007,992
Cost of sales billed, charges, etc.....	177,458,012	199,331,309
Sundry income.....	8,058,684	6,478,984
Net income.....	30,794,966	28,155,667
Interest payments.....	4,563,947	2,802,855
Investment securities reserve.....		3,700,000
Profit available for dividends.....	26,231,019	21,652,812
Less 8 per cent cash dividends.....	14,073,628	13,409,522
Surplus for the year.....	12,157,391	8,243,290
Surplus, end of previous year.....	70,126,922	70,048,611
Less stock dividends.....	8,717,265	6,746,114
Less appropriations.....	400,000	1,418,865
Surplus at December 31, 1922.....	73,167,048	70,126,922

## Obituary

**Charles A. Maher**, vice-president of the National Car Wheel Company, Cleveland, Ohio, died in a hospital in that city on April 7.

**C. S. Williamson**, formerly vice-president of the Meade-Morrison Manufacturing Company, Chicago, died at his home in that city on March 31, from pneumonia.

**Francis L. Bullard**, formerly treasurer of the Hinckley Locomotive Works and later of the Rhode Island Locomotive Works, died on April 2, at his home in Wellesley Hills, Mass., at the age of 87.

**Thomas C. deRosset**, manager southern sales of the T. H. Symington Company with headquarters at Baltimore, Md., died suddenly in that city on April 7. Mr. deRosset was born in Wilmington, N. C., on September 7, 1875. He entered the sales department of the T. H. Symington Company, Baltimore, in 1905, and was appointed manager Southern sales in 1910, his services in this capacity extending over a period of 13 years. Mr. deRosset was well known throughout the railway and supply field,



T. C. de Rosset

**Thomas Edward Crossman**, shorthand reporter, New York City, and one of the foremost convention reporters in America, died on April 4, in the Congress Hotel, Chicago, at the age of 60. His death was the result of a stroke of paralysis sustained on March 13 while reporting at the American Railway Engineering Association convention in Chicago. Mr. Crossman had reported the railroad mechanical conventions and the American Railway Engineering Association conventions for more than 20 years. He began his career as a stenographer with the Atlantic Avenue Railroad in Brooklyn, N. Y., and shortly afterward started to report meetings of the American Electric Railway Association, later taking up similar work at other conventions. He has reported the meetings of the National Electric Light Association for the past 33 years. In recognition of his service of 40 years for the American Electric Railway Association, this association last October presented Mr. Crossman with a souvenir in the form of a gold watch fob.

## Railway Construction

**CHESAPEAKE & OHIO.**—This company will construct additions to its yards at Clifton Forge, Va., to provide a modern terminal consisting of ten 100-car tracks, a double track hump with scales on each track and 20 classification tracks of sufficient length to hold 100 cars. The cost will be approximately \$3,500,000.

**CHICAGO, BURLINGTON & QUINCY.**—This company closed bids on April 10 for the construction of an extension to the roundhouse at Galesburg, Ill. Bids will be closed on April 20 for the remodelling the erection shop at Beardstown, Ill.

**EDWARD HINES YELLOW PINE TRUSTEES.**—These parties are seeking permission from the Interstate Commerce Commission for the construction of an extension of their line in Mississippi to a connection with the Louisville & Nashville. The new line would extend from the present southern terminus at Kiln to the L. & N. line at Bay St. Louis, Hancock county, Mississippi. Permission to retain excess earnings is desired.

**ELGIN, JOLIET & EASTERN.**—This company has awarded a contract to the Roberts & Schaefer Company, Chicago, for the construction of two reinforced concrete automatic electric coaling plants of 1,000 tons' capacity, at Gary, Ind., and Joliet, Ill. Each station will cost \$100,000.

**ELGIN, JOLIET & EASTERN.**—This company has awarded a contract to the T. S. Leake Construction Company, Chicago, for the construction of a 20-stall roundhouse at Gary, Ind., reported in the *Railway Age* of March 17.

**ILLINOIS CENTRAL.**—This company has authorized the separation of grades in the city of Champaign, Ill., and will construct five subways for the accommodation of street traffic. A two-story brick passenger station with connecting express and baggage buildings are included in the project at Champaign and the total cost will be approximately \$1,000,000. This company will construct 7½ miles of second main track from Springfield, Ill., to Spaulding.

**KANAWHA & WEST VIRGINIA.**—This company has applied to the Interstate Commerce Commission for permission to extend its line to provide an outlet for timber and coal properties beyond Swiss, W. Va., the present terminus of the line. The proposed extension is to be 33 miles in length, and the New York Central, the lessee of the road, represented that its lines do not have access at present to this territory.

**KANSAS CITY SOUTHERN.**—This company has been granted permission by the Interstate Commerce Commission to construct a line 14 miles long from Lawton, Kan., to Baxter Springs.

**LONGVIEW, PORTLAND & NORTHERN.**—This company, which was reported in the *Railway Age* of March 24 as revising plans for the construction of 26 miles of track from Kelso, Wash., in a northerly direction, has awarded the contract for the work to Twohy Brothers, Seattle, Wash.

**MICHIGAN CENTRAL.**—This company, having settled legal complications interfering with the construction of its proposed bridge over the Niagara river at Niagara Falls, N. Y., will call for bids for the foundation of this structure in the near future.

**MISSOURI PACIFIC.**—This company has been ordered by the Supreme Court of Missouri to construct a viaduct and elevate its tracks over those of the St. Louis-San Francisco at the intersection west of Tower Grove station, near St. Louis, Mo. The cost of the viaduct is estimated at \$200,000, of which the Missouri Pacific is to pay three-fourths and the St. Louis-San Francisco the balance.

**MISSOURI PACIFIC.**—This company closed bids on April 11 for the construction of a 120 ft. by 160 ft. machine shop at Wichita, Kan.

**MISSOURI PACIFIC.**—This company will close bids on April 20 for the construction of pumping stations, water tanks and pipe lines at Camden, Ark., Barham, Kenova and El Dorado, Kan.

## Railway Financial News

**ATCHISON, TOPEKA & SANTA FE.—Acquisition by Lease.**—See Rio Grande, El Paso & Santa Fe.

**BOSTON & PROVIDENCE.—Authorized to Issue Bonds.**—The Interstate Commerce Commission has authorized this company to issue \$2,175,000 of 5 per cent debenture bonds for the purpose of refunding a like amount of five-year, 6 per cent debenture bonds, maturing July 1.

**CENTRAL OF GEORGIA.—Annual Report.**—This company's annual report for 1922 is reviewed in an article on another page of this issue entitled "Central of Georgia Moves Record Traffic." See also excerpts from annual report on adjacent pages.

**CHESAPEAKE & OHIO.—Annual Report.**—The annual report for the year ended December 31, 1922, issued Monday, shows a net income of \$6,523,670 as compared with \$4,192,601 in 1921. A selection of the important figures in the income account follows:

	1922	1921	Increase or Decrease
Freight revenue.....	\$68,671,907	\$67,367,983	\$1,303,924
Passenger revenue.....	10,586,625	11,739,627	-1,153,002
Total operating revenues.....	83,511,561	83,687,958	-176,397
Maintenance of way and structures.....	10,558,138	12,170,021	-1,611,883
Maintenance of equipment.....	22,530,747	20,023,122	2,507,625
Traffic.....	942,913	800,618	142,296
Transportation.....	29,831,398	31,427,435	-1,596,037
General.....	1,953,360	1,983,073	-29,713
Total operating expenses.....	66,118,030	66,603,077	-485,047
Net operating revenue.....	17,393,531	17,084,881	308,650
Railway tax accruals.....	3,301,201	2,682,160	619,041
Railway operating income.....	14,081,127	14,382,012	-300,885
Net railway operating income.....	14,410,330	13,660,926	749,404
Other income.....	2,478,503	1,120,750	1,357,753
Gross income.....	16,888,833	14,781,677	2,107,156
Total deductions.....	10,365,163	10,589,075	-223,912
Net income.....	6,523,670	4,192,601	2,331,069

**CHICAGO & NORTH WESTERN.—New Director.**—A. A. Sprague has been elected a director to succeed E. D. Hulbert, deceased.

**CANADIAN PACIFIC.—To Pay Off 6 Per Cent Notes.**—An issue of \$52,000,000 6 per cent note certificates will be paid off in July after due notice by the trustee, or about seven months in advance of maturity date, March 2, 1924. These notes are secured by a special investment fund, administered by the Royal Trust Company of Montreal as trustee, consisting of deferred payments on sold lands, together with securities in which such funds might be invested, and interest accruals. On December 31, 1922, total deferred payments on lands were \$65,681,509, while trust fund amounted to \$61,032,439, more than sufficient to retire issue. These notes at first were largely held in Great Britain but many of them were sold in the United States during the war.

**CHICAGO, MILWAUKEE & ST. PAUL.—Asks Authority to Abandon Branch.**—This company has applied to the Interstate Commerce Commission for authority to abandon its branch line from Cogswell to Harlem, N. D., 5 miles.

**CHICAGO, MILWAUKEE & ST. PAUL.—Asks Authority to Sell Bonds.**—This company has asked authority from the Interstate Commerce Commission to sell at not less than 90 \$10,000,000 of its 5 per cent general mortgage bonds or to pledge and repledge them as collateral to provide funds for the carrier's initial and advance payments on new equipment ordered for 1923 delivery. The bonds are dated May 1, 1889 and are payable May 1, 1889. Because of present quotations on the St. Paul bonds no arrangement has been made for the sale of the securities.

**CHICAGO RIVER & INDIANA.—Suit to Annul New York Central Control.**—In the federal court at Chicago on April 10, a suit was filed by the Baltimore & Ohio, the Erie, the Pennsylvania, the Wabash and the Grand Trunk, asking for an injunction to restrain the New York Central from exercising any right as a stockholder in, and from exercising any control over the C. R. & I. or the Chicago Junction. The petition asks the court to suspend the order of the Interstate Commerce Commission of May 16, 1922, authorizing the purchase of the C. R. & I. by the N. Y. C., and to annul the lease of the Chicago Junction to the C. R. & I. In-

cluded in the parties named as defendant are the Union Stock Yards, Richard Fitzgerald and the United States Government. Plaintiffs ask what change in officers have been made and whether the N. Y. C. controls, and what changes have been made in tariffs.

**CRAIG MOUNTAIN.—Authorized to Issue Stock.**—This company has been authorized by the Interstate Commerce Commission to operate approximately six miles of railroad from Craig Junction to Winchester, Idaho, and to issue \$100,000 of capital stock in payment for the property of the railroad which was constructed by a lumber company.

**DELAWARE & HUDSON.—Annual Report.**—The annual report for the year ended December 31, 1922, issued on Monday, shows a net loss of \$476,000 as compared with a net profit of \$4,937,452 in 1921. A selection of the important figures in the income account follows:

	1922	1921	Increase or Decrease
Freight revenue.....	\$30,833,873	\$39,585,948	\$8,752,075
Passenger revenue.....	3,799,532	4,028,735	-229,203
Total operating revenues.....	37,823,256	45,776,859	-7,953,603
Maintenance of way and structures.....	5,140,223	5,509,990	-369,767
Maintenance of equipment.....	11,590,317	12,801,190	-1,200,873
Traffic.....	526,017	493,625	32,392
Transportation.....	16,085,687	17,880,423	-1,794,736
General.....	1,778,333	1,888,266	-109,933
Total operating expenses.....	35,615,053	38,825,529	-3,210,476
Net railway operating revenues.....	2,208,203	6,951,330	-4,743,127
Gross railway operating income.....	2,490,334	8,218,225	-5,727,891
Railway tax accruals.....	879,053	993,974	-114,921
Net railway operating income.....	1,666,212	6,759,117	-5,092,904
Total non-operating income.....	3,713,191	3,432,787	280,404
Gross income.....	4,879,404	10,191,904	-5,312,500
Total deductions.....	5,355,404	5,254,452	100,952
Net income.....	Def. 476,000	4,937,452	-5,413,452

**INTERSTATE RAILROAD.—Application to Issue Stock.**—This company has asked authority from the Interstate Commerce Commission to issue \$1,057,756 par of capital stock, to be sold at par to the Virginia Coal & Iron Company, the proprietary company, and the proceeds applied to erection of new steel bridges and to make other improvements to accommodate heavy coal traffic over its line between Appalachia and Norton.

**KEOKUK & DES MOINES.—Preferred Stockholders' Protective Committee.**—Henry I. Clark & Co., Henry Zuckerman & Co., and Seligsberg & Co., holders of 5,000 shares of preferred stock of the Keokuk & Des Moines, have called a meeting April 12 of preferred stockholders to organize a protective committee to represent them in negotiations to refund the company's 5 per cent mortgage bonds which mature October 1. The letter calling the meeting says, in part:

A majority of common stock, but not preferred stock, is owned by the lessee, the Chicago, Rock Island & Pacific Railway. On December 31 next, the lease to the Rock Island expires. In recent years the rent paid under the lease has been sufficient to cover substantial dividends on preferred stock. For the last two years, however, dividends have been withheld because of early maturity of mortgage and expiration of the lease. The Rock Island has announced it will not renew the lease on the same terms.

If the mortgage debt is to be refunded, it would seem that satisfactory terms must be secured from the Rock Island, because either independent operation or affiliation with some other trunk line would be inadvisable.

The board of directors of the Keokuk & Des Moines, consisting of Rock Island officials, has appointed a committee to study the situation. Such committee also consists of Rock Island officials, except that it has at our request added Alfred L. Becker as a minority member. E. M. Alvord, of the United States Railroad Administration, is acting as engineer on this committee.

**LONG ISLAND.—Annual Report.**—The annual report for the year ended December 31, 1922, issued Wednesday, shows a net income of \$2,165,458, as compared with \$599,619 in 1921. A selection of the important figures in the income account follows:

	1922	Increase or Decrease
Freight revenue.....	\$8,937,569	\$663,954
Passenger revenue.....	19,250,024	1,163,880
Total operating revenues.....	30,951,540	2,230,630
Maintenance of way and structures.....	3,317,775	-2,919
Maintenance of equipment.....	5,118,248	124,871
Traffic.....	214,778	-6,699
Transportation.....	13,591,051	-105,435
General.....	690,298	-47,698
Total operating expenses.....	23,173,819	-8,166
Net revenue from railway operations.....	7,777,721	2,238,795
Railway tax accruals.....	1,795,861	260,585
Railway operating income.....	5,951,290	1,982,001
Net railway operating income.....	4,967,454	1,656,240
Total non-operating income.....	585,313	-573,064
Gross income.....	5,552,767	1,083,176
Total deductions from gross income.....	3,387,309	-482,663
Net income.....	2,165,458	1,565,839
Appropriation to sinking and other reserve funds.....	430	
Balance transferred to credit of profit and loss.....	2,165,028	1,565,839



**LOUISVILLE & NASHVILLE.—Annual Report.**—The annual report for the year ended December 31, 1922, issued last week, shows a net income of \$10,598,019 as compared with a net loss of \$336,962 in 1921. A selection of the principal items in the income account follows:

	1922	1921
Freight revenue .....	\$90,648,972	\$87,487,504
Passenger revenue .....	22,793,320	23,182,690
Total operating expense .....	121,138,840	117,485,777
Maintenance of way and structures .....	16,872,543	18,740,959
Maintenance of equipment .....	30,017,110	33,096,880
Traffic .....	2,544,557	2,473,906
Transportation .....	46,932,231	49,770,953
General .....	2,707,431	2,980,275
Total operating expenses .....	99,604,496	107,408,938
Net revenue from railway operations .....	21,534,344	10,076,838
Railway tax accruals .....	4,710,347	3,494,351
Total operating income .....	16,810,396	6,562,146
Net railway operating income .....	17,604,321	5,759,639
Non-operating income .....	2,827,407	2,899,566
Total deductions .....	9,833,709	8,996,167
Net income .....	10,598,019	Def. 336,962

**MARYLAND, DELAWARE & VIRGINIA.—Foreclosure.**—Foreclosure of a \$2,000,000 mortgage on the property of this road was authorized on April 4, by Judge Morris A. Soper in the United States Court at Baltimore, Md. Officials of the road, which is a subsidiary of the Pennsylvania, consented to the foreclosure. The company defaulted on payment of interest due on first mortgage bonds.

**NEW YORK CENTRAL.—Suit to Annul Control.**—See Chicago River & Indiana.

**NEW YORK, NEW HAVEN & HARTFORD.—Annual Report.**—The annual report for the year ended December 31, 1922, issued on Monday, shows a net corporate deficit of \$4,865,768 as compared with a deficit of \$14,121,623 in 1921. A selection of the important figures in the income account follows:

	1922	Increase or Decrease
Freight revenue .....	\$59,931,677	\$6,337,747
Passenger revenue .....	49,217,795	—1,716,498
Total operating revenues .....	123,246,641	6,841,408
Maintenance of way and structures .....	16,488,932	—866,999
Maintenance of equipment .....	26,404,332	—1,020,244
Traffic .....	657,359	—71,240
Transportation .....	51,082,709	—3,645,496
General .....	3,405,297	—656,348
Total operating expenses .....	99,988,856	—6,413,439
Net operating revenue .....	23,257,785	13,254,847
Tax accruals .....	4,586,324	143,050
Railway operating income .....	19,493,624	12,730,743
Net railway operating income .....	12,074,160	11,334,126
Total non-operating income .....	6,324,906	108,031
Gross income .....	18,399,067	11,442,158
Total deductions from gross income .....	23,310,003	1,026,459
*Net income, excluding government guaran- tees .....	Def. 4,910,936	10,415,699
*Government guarantees—Credit .....	45,168	—1,159,844
Net corporate income .....	Def. 4,865,768	9,255,855

\*The figures shown against this item cover lap-over items audited during the year applying to the federal control or guaranty periods.

**NORTHERN PACIFIC.—Annual Report.**—The annual report for the year ended December 31, 1922, issued Wednesday, shows a net income of \$15,056,930, as compared with \$22,065,399 in 1921. A selection of the principal figures in the income account follows:

	1922	1921	Increase or Decrease
Operating revenues .....	\$96,076,066	\$94,538,059	\$1,538,007
Operating expenses .....	72,654,711	77,630,867	—4,976,156
Net operating revenue .....	23,421,355	16,907,192	6,514,163
Railway tax accruals .....	8,430,583	9,014,121	—583,537
Railway operating income .....	14,965,790	7,875,176	7,090,614
Net railway operating income .....	19,450,514	10,843,826	8,606,688
Total non-operating income .....	11,271,729	26,552,683	—15,280,953
Gross income .....	30,722,244	37,396,509	—6,674,265
Total deductions from gross income .....	15,665,314	15,331,110	334,205
Net income .....	15,056,930	22,065,399	—7,008,470
Dividend appropriations of income .....	12,400,000	17,360,000	—4,960,000
Income balance .....	2,656,930	4,705,399	—2,048,470

**PENNSYLVANIA.—Equipment Trust Authorized.**—The Interstate Commerce Commission has authorized this company to assume obligations and liability in respect of \$31,500,000 of equipment trust certificates to be issued by the Fidelity Trust Company and sold at not less than 97½ to Kuhn, Loeb & Co.

**PITTSBURGH, YOUNGSTOWN & ASHTABULA.—Authorized to Issue Bonds.**—This company has been authorized to issue \$3,789,000 of

first general mortgage 5 per cent bonds to be guaranteed by the Pennsylvania.

**PONCA CITY OIL FIELD RAILROAD.—Incorporation.**—This company has been incorporated with a capitalization of \$600,000, and is backed by E. W. Marland, president of the Marland Oil Company, Ponca City, Okla. The company plans to build a line from Ponca City to connect with the Chicago, Rock Island & Pacific at Billings, Okla., a distance of 34 miles. The incorporators are: R. E. Clark, D. G. Shallenberger, P. J. Stevenson, F. G. Lucas and E. Q. Blackart.

**PORTLAND TERMINAL COMPANY.—Asks Authority to Issue Notes.**—This company has applied to the Interstate Commerce Commission for authority to issue \$1,600,000 of 5½ per cent, one year notes, to be guaranteed by the Maine Central.

**RIO GRANDE, EL PASO & SANTA FE.—Lease.**—The lease of this road to the Atchison, Topeka & Santa Fe has been conditionally approved by the Interstate Commerce Commission.

**WESTERN PACIFIC.—Authorized to Sell Certificates.**—This company has been authorized by the California Railroad Commission to issue and sell at not less than 97½ per cent face value and accrued dividends, \$5,600,000 of 5½ per cent serial equipment trust certificates, and to execute an equipment trust agreement, covering the purchase of 2,000 30-ton steel underframe refrigerator cars, 100 steel underframe automobile cars, six freight locomotives, 150 logging cars, 20 steel passenger cars, eight steel dining cars and 20 steel baggage cars, costing \$6,996,776, already ordered.

**WYOMING & MISSOURI RIVER.—Authorized to Operate Line.**—The Interstate Commerce Commission has issued a certificate authorizing the operation by this company of a railroad from Aladdin to Belle Fourche, S. D., 18 miles, which was constructed several years ago by the Wyoming & Missouri River Railroad. The Wyoming & Missouri River Railway is a new company which has purchased the property of the old company.

### Treasury Payments to Railroads

Since last announcement, dated March 1, 1923, payments under Sections 204, 209, 210 and 212 of the Transportation Act, 1920, as amended, have been made by the Treasury as follows:

Section 204—	
Combs, Cass & Eastern .....	\$7,719
Mount Jewett, Kinzua & Rittville .....	11,701
Pajaro Valley Consolidated Railroad .....	54,380
Santa Maria Valley .....	25,153
Toledo, Angola & Western .....	3,335
Section 209—	
Boyer City, Gaylord & Alpena .....	21,371
Coal Belt Electric Railway .....	17,024
Hill City Railway .....	2,943
Northampton & Bath .....	36,899
Rio Grande Southern .....	6,536
Toledo Peoria & Western .....	39,104
Tug River & Kentucky .....	4,755
Union Freight Railroad .....	18,504
Section 210 .....	0
Section 212 .....	0
Total .....	\$249,424

The carriers which have paid into the Treasury excess earnings during the guaranty period pursuant to the provisions of Section 209 (d) of the Transportation Act, 1920, as amended, and the amounts severally paid by them to the United States are as follows:

Ahnapee & Western .....	\$2,940
Kewaunee, Green Bay & Western .....	261
Lake Tahoe Railway and Transportation Co. ....	5,004
Total .....	\$8,205

Note: The payments above mentioned are in addition to disbursements made to carriers by the director general of railroads.

### Dividends Declared

Pere Marquette.—Preferred, 1½ per cent, quarterly; prior preferred, 1¼ per cent, quarterly; both payable May 1 to holders of record April 13.

### Trend of Railway Stock and Bond Prices

	April 10	Last Week	Last Year
Average price of 20 representative rail- way stocks .....	65.88	66.00	64.27
Average price of 20 representative rail- way bonds .....	82.99	82.18	84.54

# Annual Report

## Central of Georgia Railway Company—Twenty-Eighth Annual Report

Savannah, Ga., March 14, 1923.

To the Stockholders:

The Board of Directors herewith submits the following report for the year ended December 31, 1922. Your property was operated under corporate management during the whole of the current and the previous year, and comparison of items submitted is again available without difficulty.

### MILES OF ROAD OPERATED

Miles of road operated at December 31, 1922.....	1,920.84
Miles of road operated at December 31, 1921.....	1,913.63

Increase ..... 7.21

The new line between McCombs, Ala., and Overton, Ala., 7.30 miles in length, was completed and put in operation in April, 1922. The line at M. P. 48, Greenville District, Columbus Division, was shortened .09 miles, on line between Opelika and Roanoke, were removed, and were replaced by The Western Railway of Alabama, thereby reducing the miles owned and correspondingly increasing trackage rights. The net result of these changes was to increase the number of miles owned 7.18 miles, and the number of miles operated under trackage rights 0.03 miles, a total increase of 7.21 miles.

### INCOME

A comparative condensed summary of the income account is stated below.

	1922	1921	+ Increase - Decrease
Average miles of road operated	1,919.06	1,913.63	+ 5.43
Operating revenues.....	\$23,286,736.52	\$22,057,498.57	\$+ 1,229,237.94
Operating expenses.....	17,941,395.57	20,020,842.57	- 2,079,447.00
Excess of revenues over expenses.....	5,345,340.95	2,036,656.01	+ 3,308,684.94
Taxes.....	1,222,280.14	899,875.21	+ 322,404.93
Uncollectible railway revenues	21,745.06	46,588.39	- 24,843.33
Total.....	1,244,025.20	946,463.60	+ 297,561.60
Operating income.....	4,101,315.75	1,090,192.41	+ 3,011,123.34
Equipment rents—Net credit.	408,628.99	235,176.69	+ 173,452.30
Joint facility rents—Net debit.	117,860.32	104,713.76	+ 13,146.56
Total.....	290,768.67	130,462.93	+ 160,305.74
Net railway operating income.....	4,392,084.42	1,220,655.34	+ 3,171,429.08
Non-operating income.....	807,761.17	918,424.05	- 110,662.88
Gross income.....	5,199,845.59	2,139,079.39	+ 3,060,766.20
Deductions from gross income	3,134,033.47	3,118,893.01	+ 15,140.46
Net income.....	\$2,065,812.12	\$*979,813.62	\$+ 3,045,625.74

\*Denotes deficit.

### NON-OPERATING INCOME

The decrease of \$110,662.88 (12.05%) in "Non-operating income" is due mainly to tentative adjustment in the 1921 accounts of your company's claim against the United States under the guaranty section of the Transportation Act, 1920, finally adjusted and settled in 1922.

### DEDUCTIONS FROM GROSS INCOME

The increase of \$15,140.46 (0.485%) in "Deductions from gross income" is due to increase of \$26,103.21 in interest on funded debt through issue of Equipment Trust "N," March 1, 1922; increase of \$43,957.53 (30.70%) in interest on advances from affiliated companies; and decrease of \$54,920.28 (8.49%) in miscellaneous deductions.

### TRANSPORTATION OPERATIONS

Increases and decreases in operating revenues and expenses, and other details of operation are presented in the following table and the comments thereunder:

	1922	1921	+ Increase - Decrease
Railway Operating Revenues.			
Freight.....	\$15,893,822.16	\$14,565,643.79	\$+ 1,328,178.37
Passenger.....	5,132,170.74	5,483,676.31	- 351,505.57
Mail.....	483,402.66	454,847.87	+ 28,554.79
Express.....	759,374.90	459,989.01	+ 299,385.89
Other passenger train.....	232,727.25	228,379.16	+ 4,348.09
Other transportation.....	307,851.82	260,780.00	+ 47,071.82
Incidental and joint facility..	477,386.99	604,182.44	- 126,795.45
Total railway operating revenues.....	23,286,736.52	22,057,498.57	+ 1,229,237.94
Railway Operating Expenses:			
Maintenance of way and structures.....	2,983,857.03	3,449,358.35	- 465,501.32
Maintenance of equipment....	4,389,661.48	4,711,701.60	- 322,040.12
Traffic.....	777,175.73	778,475.70	- 1,299.97
Transportation.....	8,824,395.56	10,052,517.47	- 1,228,121.91
Miscellaneous operations.....	88,777.20	87,677.55	+ 1,099.65
General.....	895,264.15	950,019.02	- 54,754.87
Transportation for investment—Credit.....	17,735.58	8,907.12	+ 8,828.46
Total railway operating expenses.....	17,941,395.57	20,020,842.57	- 2,079,447.00
Net revenue from railway operations.....	5,345,340.95	2,036,656.01	+ 3,308,684.94
Railway Tax Accruals.....	1,222,280.14	899,875.21	+ 322,404.93
Uncollectible Railway Revenues.....	21,745.06	46,588.39	- 24,843.33
Total.....	1,244,025.20	946,463.60	+ 297,561.60
Railway operating income	4,101,315.75	1,090,192.41	+ 3,011,123.34
Equipment Rents—Net Credit	408,628.99	235,176.69	+ 173,452.30
Joint Facility Rents—Net debit	117,860.32	104,713.76	+ 13,146.56
Total.....	290,768.67	130,462.93	+ 160,305.74
Net railway operating income.....	\$4,392,084.42	\$1,220,655.34	\$+ 3,171,429.08

### RAILWAY OPERATING REVENUES

Notwithstanding a ten per cent reduction January 1, 1922, in rates on agricultural products and live stock extended July 1, to all classes of freight, "Railway operating revenues" increased \$1,229,237.94 (5.57%). The increase of \$1,328,178.37 (9.12%) in "Freight" revenue was due to improvement in general business conditions. The tons of revenue freight carried one mile were 1,264,422,162, an increase of 151,738,721 ton miles (13.63%). Conversely the average revenue per ton was \$2.37 as compared with \$2.45 for the previous year, and the average revenue per ton mile was 1.25 cents as compared with 1.31 cents for the previous year.

The decrease of \$351,505.57 (6.41%) in "Passenger" revenue was due to continued depression in passenger travel. Revenue passengers carried one mile were 164,053,274, a decrease of 11,011,933 (6.29%). Average revenue per passenger per mile was 3.13 cents, the same as for the previous year.

The increase of \$28,554.79 (6.28%) in "Mail" revenue was due to receipt of back pay for mail carried in 1921.

The increase of \$299,385.89 (65.09%) in "Express" revenue was due to increased express traffic.

The decrease in "Other passenger train," "Other transportation," "Incidental" and "Joint facility" revenues, aggregating \$75,375.54 (6.89%), was due to decreased revenue from storage, demurrage and miscellaneous.

### RAILWAY OPERATING EXPENSES

"Railway operating expenses" decreased \$2,079,447.00 (10.39%).

The decreases of \$465,501.32 (13.50%) in "Maintenance of way and structures" and \$322,040.12 (6.83%) in "Maintenance of equipment" were due, not to any lowering of the standard of maintenance, but to decrease in the cost of labor, materials and supplies.

Charges to "Maintenance of equipment" expenses for depreciation were \$616,006.27, a decrease of \$1,945.28 (0.32%). The average miles per serviceable locomotive were 32,269, an increase of 1,102 miles (3.54%). The average age of locomotives was 19.4 years as compared with 18.2 years for the previous year.

"Traffic" expenses decreased \$1,299.97 or 0.17%.

The decrease of \$1,228,121.91 (12.22%) in "Transportation" expenses was due to decrease in wages and greater efficiency in the operation of trains. The fuel-saving campaign and the claim prevention campaign were continued through the year; resulting in a decrease of \$493,700.95 (23.83%) in fuel costs and a decrease of \$217,758.52 (65.45%) in loss and damage claims paid.

Expenses for station agents, clerks and attendants decreased \$206,487.87 (11.20%) due to a reduction in wages and force.

The decrease of \$54,754.87 (5.76%) in "General" expenses was due to reduction in wages and in force in the general offices.

### RAILWAY TAX ACCRUALS

"Railway tax accruals" were \$1,222,280.14 as compared with \$899,875.21 last year, an increase of \$322,404.93 (35.83%) due to federal income tax on increased income; to payment under a new Georgia statute of a special "fee" of \$10,710.03 for maintenance of the Georgia Public Service Commission; and to increased valuations and rates for State, County and Municipal taxes.

### UNCOLLECTIBLE RAILWAY REVENUES

"Uncollectible railway revenues" amounted to \$21,745.06 as compared with \$46,588.39 last year, a decrease of \$24,843.33 (53.32%).

### EQUIPMENT RENTS—NET CREDIT

The increase of \$173,452.30 (73.75%) in "Equipment rents—Net credit" was due to an increase in our average car miles per car day and to failure of foreign lines to return our cars because of prevailing car shortage.

### JOINT FACILITY RENTS—NET DEBIT

"Joint facility rents—Net Debit" increased \$13,146.56 (12.55%).

### FINANCIAL

The general balance sheet, Table 4, reflects the financial condition of your company at December 31, 1922, as compared with the previous year.

Capital Stock:

There were no changes in capital stock.

Funded Debt:

Central of Georgia Equipment Trust "N" for \$660,000 was issued March 1, 1922, for approximately 80% of the cost of five hundred steel underframe ventilated box cars. The certificates mature in ten equal annual installments 1923 to 1932, inclusive, with interest at 5% per annum, payable semi-annually.

\$100,000 certificates of equipment Trust "L" matured and were retired and cancelled.

\$30,000 of Upper Cahaba Branch First Mortgage Bonds and \$30,000 of Greenville and Newnan Main Line First Mortgage Bonds matured and were retired and cancelled.

\$3,000 of Second Preference Income Bonds were purchased and cancelled.

Other Indebtedness:

Non-negotiable debt to affiliated companies decreased \$852,915.83.

Securities and Current Assets:

There were purchased during the year from current cash \$1,550,000 par value of Liberty Bonds and U. S. Treasury Certificates.

The decrease in current assets is more than accounted for by this decrease in cash; by decrease of \$1,095,399.20 in the stock of materials and supplies carried in stock; and by elimination during the year, through final settlement with U. S. Railroad Administration, of claim for unpaid compensation formerly carried at \$1,370,164.72. To these causes should be added the gratifying improvement in collection of "bills collectible" and in prompt collection and transmission of "agents' balances."

Dividends:

During the year preferred dividends Nos. 20 and 21 (total \$900,000) at the stipulated rate of six per cent per annum, and common dividends Nos. 16 and 17 (total \$250,000) at the rate of five per cent per annum, were declared and paid.

Accounts With Director General:

Final settlement with the United States Railroad Administration of accounts growing out of Federal control was effected January 3, 1922.

Government Guaranty:

Final settlement with the United States Government of the amount accrued to your company under the six months' guaranty given by the Transportation Act, 1920, was effected December 28, 1922.

### PHYSICAL CHANGES

The following is a summary of important improvements during the year, the cost of which was wholly or in part charged to investment accounts:

Roadway and Structures:

45,813 miles of main track were relaid with new 90 pound steel rail, of which 8,0010 miles replaced rail of the same weight and 37,8127 miles replaced rail of lighter weight. 20,5394 miles of main track were relaid with second hand steel rail, replacing rail of lighter weight. 6,2541 miles of track were relaid with second hand steel rail, replacing rail of same weight. Total mileage of track relaid with new and second hand steel rail was 72,6072.

552,516 cross ties were renewed, being equivalent to 191.01 miles of continuous track, or 8.09% of all ties in track, including sidings.

42 new industrial tracks aggregating 4.41 miles were added, while 13 industrial tracks aggregating 1.03 miles were removed; a net increase of 29 industrial tracks, equivalent to 3.38 miles.



26 new company sidings aggregating 2.42 miles were added, while 46 company sidings aggregating 1.64 miles were removed; a net decrease of 20 company sidings and a net increase of .78 miles.

75.65 miles of ballasted track were repaired or renewed to restore the track to its original standard.

Work was completed on the new line between McCombs and Overton, Ala. This line serves the Bragg and Glass Seams situated in what is commonly known as the Waterworks Basin of the Lower Cahaba Coal Fields. The line is constructed of 80 pound relay steel rail, creosoted oak cross ties, and is ballasted with slag screenings to a depth of six inches. The length of the main line is 7.30 miles, and in addition 3.36 miles of yard tracks and sidings were constructed.

Work was completed on change of line at Mile Post 48, Greenville District, Columbus Division. A trestle 509 feet in length was filled and a triple 8 ft. x 10 1/4 ft. reinforced concrete box culvert provided. The line was shortened 455.6 feet, or .086 miles, and 113 degrees of curvature eliminated.

Two new 150 ton, 50 foot, four section Fairbanks Track Scales were installed, one at Industry, Ga., on the Atlanta District, and one at Overton, Ala. 2,559 lineal feet of pile and timber trestles were replaced by culverts and embankment.

4,641 lineal feet of untreated pile and frame trestles were rebuilt in creosoted material to conform to standard.

1,839 lineal feet of cast-iron and reinforced concrete pipe, and reinforced concrete boxes, were installed to provide waterways for trestles filled, and 2,218 lineal feet of cast-iron and reinforced concrete pipe and reinforced concrete boxes were installed to replace crushed terra-cotta pipes and wooden box drains.

39 new section motor cars were purchased to replace hand cars. This completes the initial motor car equipment of the entire mileage.

Equipment: Two new Mountain Type locomotives were acquired. One locomotive of an obsolete type was sold. Ten locomotives of an obsolete type were condemned and torn down. Eight Consolidation Type locomotives were retired from service and sent to the American Locomotive Company to be rebuilt into Mikado Type locomotives. The net decrease was seventeen locomotives, with a decrease of 377,463 pounds in tractive power. These decreases will be more than offset by the return to service of the eight converted locomotives and the acquisition of twenty-five new locomotives contracted for since the close of the year.

One coach and two baggage and seat cars were sold. Five hundred new ventilated box cars, numbered 55001 to 55500 inclusive, were acquired during the year. Seventy-nine all steel coal cars in 1900-20499 series were rebuilt and changed to 20501 series. Fifteen of these cars were rebuilt at Columbus shops and sixty-four by outside companies. The average capacity of freight train cars at the close of the year was 39.3 tons and the total capacity was 331,310 tons.

\$10,974.59 were expended in the application of superheaters, valve gears, piston valves and other improvements to locomotives, and \$8,165.74 in reinforcement of draft gear and in other additions and betterments to cars.

#### GENERAL

Any record of the year's happenings would be incomplete without some reference to the strike of members of the Federated Shop Crafts, who left their work on July 1, 1922, in protest against a reduction of wages made by the United States Railway Labor Board. In spite of the fact that nearly all of the skilled white employees walked out of the shops, the supervisory forces and the loyal men made possible the operation of the road without interruption of the service until August 3, 1922, at which time the employment of new men began. This was continued until November 7th, when, in point of numbers and efficiency, normal conditions were restored. The emergency was met without unfavorable results to either finances or operation.

The attached tables exhibit the financial condition of your company and the result of the year's transactions.

The Board of Directors takes this opportunity to express its appreciation for the integrity, efficiency and united efforts displayed by your officers and employees in the discharge of their duties.

By Order of the Board of Directors.

CHARLES H. MARKHAM,  
Chairman of the Board.

#### CENTRAL OF GEORGIA RAILWAY COMPANY Income Statement Year Ended December 31

	1922	Per Cent of Total Operating Revenues	1921	Per Cent of Total Operating Revenues	+ Increase — Decrease
Av. miles operated.	1,919.06		1,913.63		+ 5.43
<b>Railway Operating Revenues:</b>					
I. Transportation—					
Rail Line:					
101. Freight .....	\$15,893,822.16	68.25	\$14,565,643.79	66.03	\$+1,328,178.37
102. Passenger .....	5,132,170.74	22.04	5,483,676.31	24.86	— 351,505.57
103. Excess baggage .....	37,963.13	.16	38,117.94	.17	— 154.81
104. Sleeping car .....	149,841.62	.65	147,828.28	.67	+ 2,013.34
105. Parlor and chair car .....	17,107.99	.07	16,844.24	.08	+ 263.75
106. Mail .....	483,402.66	2.08	454,847.87	2.06	+ 28,554.79
107. Express .....	759,374.90	3.26	459,989.01	2.09	+ 299,385.89
108. Other passenger train .....	7,095.97	.03	6,433.40	.03	+ 662.57
109. Milk .....	20,718.54	.09	19,155.30	.09	+ 1,563.24
110. Switching .....	286,956.57	1.23	242,001.15	1.10	+ 44,955.42
111. Special service train .....	20,895.25	.09	18,778.85	.08	+ 2,116.40
Total .....	22,809,349.53	97.95	21,453,316.14	97.26	+1,356,033.39
III. Incidental:					
131. Dining and buffet .....	73,396.55	.32	75,721.06	.34	— 2,324.51
132. Hotel and restaurant .....	4,137.90	.02	4,239.96	.02	— 102.06
133. Station tr'n and boat privileges .....	43,935.60	.19	44,628.96	.20	— 693.36
134. Parcel room .....	203.94	...	637.80	...	— 433.86
135. Storage—Fr'ght .....	96,253.25	.41	190,181.99	.86	— 93,928.74
136. Storage—Bagg .....	1,400.95	...	1,550.63	...	— 149.68
137. Demurrage .....	49,480.42	.21	62,796.02	.29	— 13,315.60
141. Power .....	4,147.14	.02	3,878.53	.02	+ 268.61
142. Rents of bldgs. & other prop'ty .....	3,390.32	.01	5,551.01	.03	— 2,160.69

Year Ended December 31						
	1922	Per Cent of Total Operating Revenues	1921	Per Cent of Total Operating Revenues	— Decrease + Increase	
143. Miscellaneous..	157,090.08	.68	181,019.47	.82	—	23,929.39
Total .....	433,436.15	1.86	570,205.43	2.58	—	136,769.28
IV. Joint Facility:						
151. Joint facility						
—Cr. ....	43,994.86	.19	34,006.70	.16	+	9,988.16
152. Joint facility						
—Dr. ....	44.02	...	29.69	...	+	14.33
Total .....	43,950.84	.19	33,977.01	.16	+	9,973.83
Total railway operating revs.	23,286,736.52	...	22,057,498.58	...	+	1,229,237.94
Railway Operating Expenses:						
201-280. Maint. of way & struct's	2,983,857.03	12.81	3,449,358.35	15.64	—	465,501.32
301-337. Maint. of equipment ...	4,389,661.48	18.85	4,711,701.60	21.36	—	322,040.12
351-359. Traffic ...	777,175.73	3.34	778,475.70	3.53	—	1,299.97
371-420. Transportation Rail line..	8,824,395.56	37.90	10,052,517.47	45.57	—	1,228,121.91
441-446. Miscellan' operations ....	88,777.20	.38	87,677.55	.40	+	1,099.65
451-462. General ..	895,264.15	3.85	950,019.02	4.31	—	54,754.87
471. Trans'p'n for invest'm't—Cr..	17,735.58	.08	8,907.12	.04	+	8,828.46
Total railway operat'g exp's	17,941,395.57	77.05	20,020,842.57	90.77	—	2,079,447.00
Net rev. from railway opert's	5,345,340.95	22.95	2,036,656.01	9.23	+	3,308,684.94
532. Railway Tax Accruals ....	1,222,280.14	5.25	899,875.21	4.08	+	322,404.93
533. Uncollectible Railway Revs.	21,745.06	.09	46,588.39	.21	—	24,843.33
Railway operating income...	\$4,101,315.75	17.61	\$1,090,192.41	4.94	+	\$3,011,123.34
		1922		1921	+	Increase
Railway operating income—brought forward.....	\$4,101,315.75		\$1,090,192.41		+	\$3,011,123.34
Additions to Railway Operating Income:						
503. Hire of freight cars—Credit balance .....	393,319.89		235,492.89		+	157,827.00
504. Rent from locomotives.....	20,387.42		22,343.57		—	1,956.15
505. Rent from passenger-train cars ..	118,198.84		90,954.64		+	27,244.20
507. Rent from work equipment ..	10,358.80		9,416.05		+	942.75
508. Joint facility rent income....	44,409.37		50,321.75		—	5,912.38
Total additions to railway operating income.....	586,674.32		408,528.90		+	178,145.42
Deductions from Railway Operating Income:						
537. Rent for locomotives.....	25,191.51		18,534.27		+	6,657.24
538. Rent for passenger-train cars ..	106,616.89		102,693.27		+	3,923.62
540. Rent for work equipment .....	1,827.56		1,802.92		+	24.64
541. Joint facility rents.....	162,269.69		155,035.51		+	7,234.18
Total deductions from railway operating income...	295,905.65		278,065.97		+	17,839.68
Net railway operating income .....	4,392,084.42		1,220,655.34		+	3,171,429.08
Non-Operating Income:						
502. Revenues from miscellaneous operations .....	24,173.42		41,888.89		—	17,715.47
509. Income from lease of road...	13,287.81		45,299.64		—	32,011.83
510. Miscellaneous rent income....	108,676.59		107,062.11		+	1,614.48
511. Miscellaneous non-operating physical property .....	43,996.35		25,968.43		+	18,027.92
513. Dividend income .....	431,872.09		432,639.25		—	767.16
514. Income from funded securities ..	128,739.73		127,655.66		+	1,084.07
515. Income from unfunded securities and accounts.....	57,001.18		36,413.32		+	20,587.86
519. Miscellaneous income .....	14.00		101,496.75		—	101,482.75
Total non-operating income	807,761.17		918,424.05		—	110,662.88
Gross income .....	5,199,845.59		2,139,079.39		+	3,060,766.20
Deductions from Gross Income:						
534. Expenses of miscellaneous operations .....	31,036.47		37,444.68		—	6,408.21
542. Rent for leased roads.....	370,766.42		371,422.47		—	656.05
543. Miscellaneous rents .....	136,226.78		135,887.49		+	339.29
546-A. Interest on funded debt ..	2,355,393.30		2,329,290.09		+	26,103.21
546-B. Interest on non-negotiable debt to affiliated companies ..	187,146.11		143,440.78		+	43,705.33
547. Interest on unfunded debt ..	*674.19		7,588.50		—	8,262.69
548. Amortization of discount on funded debt .....	37,673.50		33,891.31		+	3,782.19
551. Miscellaneous income charges .....	16,465.08		59,927.69		—	43,462.61
Total deductions from gross income .....	3,134,033.47		3,118,893.01		+	15,140.46
Net income .....	\$2,065,812.12		\$*979,813.62		+	\$3,045,625.74

\*Denotes credit or deficit as may be appropriate.

[ADVERTISEMENT]

## Railway Officers

### Executive

**H. J. German** has been elected president of the Montour with headquarters at Pittsburgh, Pa.

**A. F. Wortman** has been elected president and **N. E. Ball**, vice-president and general manager of the Fernwood, Columbia & Gulf with headquarters at Fernwood, Miss.

**J. W. Taylor**, assistant to the president of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has been elected vice-president in charge of the Purchasing and Stores Departments with the same headquarters. **F. H. Johnson**, office assistant to the vice-president of the Operating Department, with headquarters at Chicago, has been promoted to assistant to the president with the same headquarters.

**F. W. Leamy**, whose appointment as assistant to the president of the Delaware & Hudson, with headquarters in New York, was announced in the *Railway Age* of April 7, was born on November 3, 1886, at West Rutland, Vermont. He was educated in the public and high schools of that place and in the Rutland Business College, and entered railroad service in August, 1902, in station service on the Delaware & Hudson. After holding various positions in that service—checker, switchman, station baggage master, express clerk, inbound and outbound freight billing clerk, ticket clerk and telegrapher, he entered the New York city passenger office in June, 1905, as ticket clerk and later as ticket agent. From October, 1906, to September, 1907, he served as stenographer in the president's office from September, 1907, to March, 1908, as secretary to the third vice-president; and from the latter date until April 1, 1923, as secretary to the president. In addition, from January to July, 1917, he was assistant secretary and secretary of the executive committee of the Wheeling & Lake Erie and since June, 1918, has been secretary of the Eastern President's Conference Committee.

**H. F. Sanborn**, whose promotion to assistant to the vice-president of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., was reported in the *Railway Age* of March 31, was born on November 11, 1888, at St. Paul, Minn. He attended Dartmouth College in 1908 and 1909 and entered railway service in December of the latter year as tariff and rate clerk on the Great Northern at St. Paul, Minn. He was promoted to chief tariff inspector in 1911, and a year later was promoted to contracting freight agent, with headquarters at Seattle, Wash. He was promoted to general agent, with headquarters at St. Paul, Minn., in 1914, and served in this capacity until 1916, when he was appointed general agent at Minneapolis, Minn., for the Chicago & Eastern Illinois and the St. Louis-San Francisco. He was transferred to St. Louis, Mo., as general agent for the Frisco in 1917, which position he held for one year. He then entered the service of the Emergency Fleet Corporation following which he returned to the St. Louis-San Francisco as service agent, with headquarters at St. Louis. He was promoted to division freight agent, with headquarters at Kansas City, Mo., in March, 1919, which position he held until October, 1922, when he was promoted to general agent,



H. F. Sanborn

with the same headquarters. He was serving in this capacity at the time of his recent appointment as assistant to the vice-president, with headquarters at St. Louis.

### Financial, Legal and Accounting

**W. D. Keeson** has been appointed director of insurance of the Canadian National with headquarters at Montreal. **F. A. Bourne** has been appointed superintendent of pension funds and relief with the same headquarters.

### Operating

**J. E. Hughes** has been appointed superintendent of the Pittsburgh & Lake Erie with headquarters at Pittsburgh, succeeding **J. B. Yoke, Jr.**, deceased.

**B. A. Frazier** has been appointed assistant trainmaster of the Toledo division of the Northwestern region of the Pennsylvania, with headquarters at Detroit, Mich.

**G. E. Patterson**, whose promotion to general superintendent of the Northern lines of the Illinois Central, with headquarters at Chicago, was reported in the *Railway Age* of March 31, was born on June 23, 1869, in Marion county, Ill. He entered railway service in 1898 as a station agent and telegraph operator on the Illinois Central. He served in this capacity until October, 1903, when he was promoted to division agent. In September, 1904, he was promoted to inspector of weights and held this position until August, 1905, when he was promoted to trainmaster. Mr. Patterson continued in this capacity until July, 1913, when he was promoted to superintendent of the Springfield division. He was transferred to the Louisiana division in November, 1915, and again to the Illinois division in October, 1918. On July 28, 1920, he was promoted to acting general superintendent of the Northern lines, with headquarters at Chicago, in which position he was serving at the time of his recent promotion.



G. E. Patterson

**J. C. Goodfellow** has been appointed acting assistant superintendent of the San Joaquin division of the Southern Pacific, with headquarters at Bakersfield, Cal., succeeding **P. Slater**, who has been assigned to other duties.

**H. T. Moore**, trainmaster of the Atchison, Topeka & Santa Fe with headquarters at Newton, Kan., has been promoted to assistant superintendent with the same headquarters. **H. G. Arnold**, trainmaster with headquarters at Arkansas City, Kan., has been transferred to Newton, succeeding Mr. Moore. **C. F. Krammes** has been appointed trainmaster with headquarters at Arkansas City, succeeding Mr. Arnold. **W. C. Baisinger**, district engineer of the Eastern district with headquarters at Topeka, Kan., has been appointed assistant superintendent with headquarters at Arkansas City, succeeding **G. H. Saunders**, who has been assigned to other duties. **L. C. Brown**, trainmaster with headquarters at Kansas City, Mo., has been transferred to Chicago as terminal trainmaster. **C. S. Cravens** has been appointed trainmaster with headquarters at Wellington, Kan.

**T. Hamilton**, superintendent of the Louisville division of the Pennsylvania with headquarters at Louisville, Ky., has been transferred to the Indianapolis division with headquarters at Indianapolis, Ind., succeeding **J. W. Coneys**, deceased. **C. E. Brinser**, engineer maintenance of way of the Eastern Pennsylvania division with headquarters at Harrisburg, Pa.,



has been promoted to superintendent of the Louisville division with headquarters at Louisville succeeding Mr. Hamilton.

**W. M. Weidenhamer**, general superintendent of the Southern district of the Chicago, Milwaukee & St. Paul, with headquarters at Savanna, Ill., has been transferred to the Northern district, with headquarters at Minneapolis, Minn., succeeding J. H. Foster, promoted. **O. N. Harstad**, superintendent of the Aberdeen division, with headquarters at Aberdeen, S. D., has been promoted to general superintendent of the Southern district, with headquarters at Savanna, Ill., succeeding Mr. Weidenhamer. **J. E. Hills**, trainmaster on the River division, with headquarters at Minneapolis, Minn., has been promoted to superintendent of the Aberdeen division, with headquarters at Aberdeen, S. D., succeeding Mr. Harstad. **J. W. Blossingham**, trainmaster, with headquarters at Chicago, has been transferred to the River division, with headquarters at Minneapolis, Minn., succeeding Mr. Hills. **L. F. Donald**, has been appointed trainmaster, with headquarters at Chicago, succeeding Mr. Blossingham.

**J. F. Walker**, whose promotion to superintendent of the New Orleans division of the Yazoo & Mississippi Valley with headquarters at Vicksburg, Miss., was reported in the

*Railway Age* of March 31, was born on November 21, 1877, at Paducah, Ky. He entered railway service on January 10, 1898, as a special machinist's apprentice in the Paducah shops of the Illinois Central and two years later was promoted to journeyman. He was promoted to roundhouse foreman in January, 1901, and was subsequently promoted to machine shop foreman, in which position he served until September, 1906, when he was promoted to general foreman of the Evansville district, with head-

quarters at Princeton, Ky. He was transferred to the Paducah shops in May, 1907, and held this position until August, 1909, when he was promoted to master mechanic, with headquarters at East St. Louis, Ill. He was transferred to Paducah in May, 1910, and served in this capacity until the time of his recent promotion to superintendent of the New Orleans division.

#### Traffic

**W. F. Yowell** has been appointed commercial agent for the Chicago & Alton, with headquarters at Chicago.

**G. J. O'Dowd** has been appointed district freight agent with the Canadian Pacific with headquarters at Quebec, P. Q.

**B. M. Croll** has been appointed division freight agent of the Philadelphia & Reading with headquarters at Philadelphia.

**L. H. Geller**, division freight agent of the Erie, with headquarters at Cleveland, Ohio, has been promoted to general freight agent, with the same headquarters.

**R. B. Cunningham**, assistant general freight agent of the Atchison, Topeka & Santa Fe with headquarters at Topeka, Kansas, has resigned to engage in other business.

**H. B. Wood**, assistant industrial agent of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Cincinnati, has been promoted to industrial agent, with the same headquarters.

**C. V. Manker** has been appointed commercial agent for the Southern, with headquarters at St. Louis, Mo. **E. B. Ditto**

has been appointed commercial agent, with headquarters at East St. Louis, Ill.

**A. B. Chown**, assistant general passenger agent of the Grand Trunk, with headquarters at Chicago, has been promoted to general passenger agent, with the same headquarters, succeeding J. D. McDonald, who has retired.

**J. H. Brown**, commercial agent of the Mississippi-Warrior River Service, with headquarters at Mobile, Ala., has been appointed traffic manager of the Chicago & Western Indiana and the Belt Railway of Chicago, with headquarters at Chicago, succeeding F. A. Spink, deceased.

**O. S. Scott**, general passenger agent of the Canadian National, with headquarters at Vancouver, B. C., has been transferred to Winnipeg, Man., succeeding **W. E. Duperow**, promoted. **G. A. McNichol**, assistant general passenger agent, with headquarters at Prince Rupert, B. C., has been promoted to general passenger agent, with headquarters at Vancouver, succeeding Mr. Scott. **H. McEwan** has been appointed division freight agent, with headquarters at Prince Rupert, B. C.

#### Mechanical

**O. D. Brizzell** and **F. B. Harman** have been appointed assistant superintendents of shops of the Atchison, Topeka & Santa Fe with headquarters at San Bernardino, Cal.

**J. C. Bryan**, superintendent of shops of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., has been appointed mechanical assistant to the manager of purchases of the American Short Line Railroad Association, with headquarters at Chicago.

**H. N. Seely**, general foreman, locomotive department, of the Illinois Central, with headquarters at Waterloo, Ia., has been promoted to master mechanic, with headquarters at Centralia, Ill., succeeding **C. M. Starke**, who has been transferred to Paducah, Ky., as reported in the *Railway Age* of March 31.

**Geo. E. McCoy**, whose appointment as superintendent of car equipment of the Atlantic region of the Canadian National with headquarters at Moncton, N. B., was announced in the *Railway Age* of March 10, page 593, was born on January 8, 1886, at Moncton, N. B., and was educated in the public schools of that city. He entered railway service in 1900 as a machinist's and draftsman's apprentice with the Intercolonial Railway. In 1905 he was promoted to draftsman and served in that capacity until 1914 when he was appointed assistant chief draftsman for the Canadian Government Railways with which the Intercolonial had been merged. Two years later he was promoted to assistant

master car builder. On December 20, 1918, he was advanced to master car builder of the Canadian National, Eastern lines, and held that position until the time of his recent appointment as superintendent of car equipment of the Atlantic region.

**H. Modaff**, superintendent of shops on the Chicago, Burlington & Quincy, with headquarters at Aurora, Ill., has been promoted to assistant superintendent of motive power, Lines East of the Missouri river, with headquarters at Chicago. **J. A. Carney**, supervisor of fuel economy, with headquarters at Chicago, has been promoted to superintendent of shops, with headquarters at Aurora, Ill., succeeding Mr. Modaff.



J. F. Walker



G. E. McCoy

Paul Maddox has been appointed superintendent of the car department of the Chesapeake & Ohio with headquarters at Richmond, Va. G. H. Langton has been appointed mechanical inspector. George Stroner has been appointed tool supervisor. S. M. Carroll has been appointed general master boilermaker with jurisdiction over the entire system.

W. G. Black, whose promotion to superintendent of motive power of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, was reported in the *Railway Age* of March 10, entered railway service in February, 1903, as a machinist on the New York, Chicago & St. Louis, at Stony Island (Chicago), Ill. He was promoted to foreman of the machine shop in July of the same year and served in this capacity until February, 1904, when he was promoted to roundhouse foreman at Ft. Wayne, Ind. He held this position until January 1, 1909, when he was promoted to master mechanic, with headquarters at Stony Island, Ill., in which position he was serving at the time of his recent promotion to superintendent of motive power, with headquarters at Cleveland, Ohio.

G. B. Frahel, superintendent of motive power of the Central Ohio division of the Pennsylvania with headquarters at Columbus, Ohio, has been given jurisdiction over the Indiana division and will retain present headquarters, the offices of Superintendent of Motive Power of the two divisions having been consolidated. J. E. Mechling, superintendent of motive power of the Indiana division, has been appointed special inspector in the office of the general superintendent of motive power with headquarters at St. Louis, Mo. R. H. Flinn, master mechanic of the St. Louis division with headquarters at Terre Haute, Ind., has been transferred to the Indianapolis, Louisville and South Bend divisions with headquarters at Indianapolis, Ind., succeeding T. F. Butler, who has retired. H. R. Voelker, assistant master mechanic of the Indianapolis division with headquarters at Indianapolis, has been promoted to master mechanic of the St. Louis division with headquarters at Terre Haute, Ind., succeeding Mr. Flinn. T. F. Haynes, assistant engineer of motive power, with headquarters at Columbus, Ohio, has been promoted to assistant master mechanic of the Indianapolis, Louisville and South Bend divisions with headquarters at Indianapolis, succeeding Mr. Voelker.

#### Engineering, Maintenance of Way and Signaling

J. R. Leighty, engineer western group of the President's Conference Committee of valuation, has been appointed special engineer in charge of valuation of the Southern with headquarters at Washington, D. C., succeeding D. W. Lum, who has been appointed consulting special engineer of valuation on account of ill health.

J. B. Baker, engineer maintenance of way of the Lake division of the Pennsylvania with headquarters at Cleveland, Ohio, has been transferred to the Eastern Pennsylvania division with headquarters at Harrisburg, Pa., succeeding C. E. Brinser, promoted. F. H. Watts, engineer maintenance of way of the Illinois division with headquarters at Chicago, has been transferred to the Lake division with headquarters at Cleveland, succeeding Mr. Baker. S. L. Church, division engineer of the Baltimore division with headquarters at Baltimore, Md., has been promoted to engineer maintenance of way of the Illinois division with headquarters at Chicago, succeeding Mr. Watts.

#### Purchasing and Stores

C. S. Finlayson has been appointed assistant purchasing agent of the Chicago, Milwaukee & St. Paul, with headquarters at Seattle, Wash.

The following appointments in the stores department of the Canadian National have been announced: A. E. Cox, general storekeeper, and D. Robertson, assistant general storekeeper, Western region, Winnipeg; E. J. McVeigh, general storekeeper, and E. D. Toye, assistant general storekeeper, Central region, Toronto; W. E. Logan, general storekeeper, Atlantic region, Moncton, N. B.

#### Special

W. E. Williams has been appointed manager of the Department of Personnel of the Missouri-Kansas-Texas with headquarters at St. Louis, Mo. Z. G. Hopkins has been appointed manager of the Department of Public Relations with the same headquarters.

#### Obituary

John G. Rodgers, vice-president of the Pennsylvania with headquarters at Chicago, died suddenly on April 11 on the golf course of the Camden Country Club, Camden, S. C.

W. L. Danley, former assistant to the traffic manager of the Nashville, Chattanooga & St. Louis, with headquarters at Nashville, Tenn., died in that city on April 7. Mr. Danley had retired from active service on July 1, 1918.

F. A. Spink, traffic manager of the Chicago & Western Indiana and the Belt Railway of Chicago, with headquarters at Chicago, died in that city on March 30. Mr. Spink was born on June 16, 1866, at Ft. Vancouver, Wash. He entered railway service in 1892, in the employ of the Richmond & Danville. In 1897, he was appointed traffic manager for the Anglo-American Provision Company and vice-president of the Anglo-American Refrigerator Car Company, which position he held until 1902. At this time he was appointed traffic manager of the National Packing Company and general manager of the National Car Line Company. He held this position until 1909, when he was appointed traffic manager for the Chicago & Western Indiana and the Belt Railway of Chicago. Mr. Spink held this position until his death, with the exception of the period of Federal control, when he was assigned to the operating department.

Alexander Robertson, vice-president in charge of operation of the Missouri Pacific, with headquarters at St. Louis, died in that city on April 6. Mr. Robertson entered railway service in 1885 as a brakeman on the Fitchburg, and until April, 1897, served consecutively as brakeman, conductor, general yardmaster, stationmaster and trainmaster. He was appointed general yardmaster on the Middle division of the Wabash in November, 1897, and was later promoted to trainmaster and superintendent. He was appointed manager of the Western Maryland and the West Virginia Central & Pittsburg in August, 1903, and held this position until January, 1904, when he was appointed general manager of the Terminal Railroad Association of St. Louis. Mr. Robertson was appointed general manager of the Western Maryland and the West Virginia Central & Pittsburg on November 1, 1905, and served in this capacity until April, 1907, at which time he was promoted to vice-president and general manager. He was elected president on May 1, 1911, but on January 1, 1913, resigned to accept the position of assistant to the president of the Missouri Pacific and the St. Louis, Iron Mountain & Southern. He was elected vice-president in charge of operation of these roads on April 1, 1915. During the receivership of these companies from August 19, 1915, to May 31, 1917, he served as chief operating officer. Upon their reorganization he was re-elected vice-president in charge of operation. During federal control, he was federal manager of the Missouri Pacific, the Louisiana & Arkansas, and the St. Louis Southwestern railway north of Texas. Upon the termination of Federal control, he returned as vice-president in charge of operation to the Missouri Pacific.



Alexander Robertson